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OCCUPATIONAL HEALTH AND SAFETY STUDY

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APPENDICES

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OCCUPATIONAL HEALTH AND SAFETY STUDY

CENTRE FOR OFFSHORE AND REMOTE MEDICINE

FACULTY OF MEDICINE

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

A. M. House
H. J. Manson
J. R. Martin
T. M. Rahal

APPENDICES

APPENDIX I

CENTRE FOR OFFSHORE AND REMOTE MEDICINE

(MEDICOR)

OCCUPATIONAL HEALTH AND SAFETY AND RELATED MATTERS STUDY OUTLINE

HEALTH PROBLEMS ON RIGS AS THEY ARE CURRENTLY REPORTED

The major health problems, injuries, illnesses, etc., including unique problems such as diving accidents, isolation factors, emotional illness, etc., will be reviewed. Information will be obtained from the oil industry, Workers' Compensation Board and Petroleum Directorate, and other agencies. Information will be obtained from the U.K. and Norwegian North Sea and other relevant areas (Gulf of Mexico).

PRE-EMPLOYMENT MEDICAL ASSESSMENT FOR WORK IN VARIOUS CATEGORIES

General - all workers

Special - E.g., diving, submersible pilots, high tech instrument personnel

HEALTH CARE AND PREVENTION ON BOARD RIG

a) Personnel:

Physicians, medics, Registered Nurses, medical technicians, medical escorts.

b) Facilities and Supplies:

Drugs and medical supplies, stretchers and other evacuation equipment, instruments and materials (?need for x-rays and electrocardiographs)

c) Qualification of Individuals Providing Care at Various Levels

First aid, cardiopulmonary support, medical escorts, medics, Registered Nurses, physicians.

d) Catering and Hygiene

e) Environmental Problems On Board

Exposure to chemicals, gases, heat, inflammables, small closed 'community'.

f) Relationship of Various Individuals Responsible for Medical Care

Company Medical Director, local company doctor, physician on rig or physician supervising medic or Registered Nurse.

APPENDIX I

g) Reporting Mechanism for all Illnesses and Accidents

Central registry, responsibility, Federal, Provincial, industry pooling and reporting of information.

h) Special Health and Safety Problems

Diving problems, hypothermia, exposure, other hazards of the workplace. (Diving is an essential activity of most drilling and production operations.)

i) Standby Vessels and Hospital Ship

?Evacuation by sea.

j) Interface Between Health and Safety

Survival suits, medical considerations of lifeboat construction and outfitting, unique medical problems associated with automatic lifeboat launching.

MEDICAL SERVICES ONSHORE

- a) Supervising physician for rig medical person;
- b) 24-hour emergency medical coverage;
- c) Access to hospital;
- d) Helicopter landing;
- e) Emergency Department facilities and personnel;
- f) In-patient services - e.g. Burn Unit, orthopaedic services, eye services;
- g) Adequate hyperbaric (diving) medical facilities;
- h) Multidisciplinary teams trained to accept casualties from offshore;
- i) Expert teams (surgeon, anaesthetist, technician, etc.) available to go offshore to give treatment or facilitate transfer or both;
- j) Disaster - highly specialized disaster plan.

APPENDIX I

COMMUNICATIONS

- a) Protocol to ensure clear lines of communication and action between various medical and administrative individuals on board and in industry offices, hospitals and Government agencies.
- b) Modes of communication:
 - . Radiotelephone
 - . VHF
 - . Satellite communications
 - . Confidentiality (scrambling)
 - . Transmission of medical data (EKG, x-rays, other vital data)
 - . Teleconferencing internationally in special situations (diving emergency, disaster, evacuation of large number of workers)

TRANSPORTATION

- a) Modes and Facilities

Helicopter, ship, landing areas, ground transfer. Protocol for coordination of procedures. Clarify relationship between personnel on board, company physicians and managers and hospital personnel.

REGULATIONS HAVING IMPACT ON HEALTH AND SAFETY

Review of regulations of various departments and agencies of Provincial, Federal Governments. Comparison with regulations in U.K., Norway, U.S.

EDUCATION AND TRAINING

- a) Level of medical knowledge required by all workers, e.g. first aid.
- b) Qualification of various health providers, physicians, medics, (Armed Forces, R.N., other).
- c) Consider curricula for training all health personnel.
- d) Continuing education programs.
- e) Consideration will be given to the best methods of collaboration of various agencies providing education and training, e.g., University, hospitals, nursing schools, Fisheries College, etc.

APPENDIX I

- f) Special consideration of training in area of diving systems, handling of gases, decompression, etc.

The current situation in Newfoundland and Labrador will be reviewed taking advantage of the substantial amount of information which is already available. The situation in Nova Scotia will be reviewed with agencies of Government, Dalhousie University, and other appropriate agencies. There have already been discussions between Memorial University and medical and safety representatives of the oil industry in Calgary and with the Advisory Committee to the East Coast Petroleum Operators Association. Further information will be exchanged.

There is already a substantial amount of information on file about the U.K. offshore industry's health and safety situation. This will be expanded and the Norwegian sector data will be collected and reviewed. Some of the experiences in the Gulf of Mexico are also applicable to the northern areas.

Current relevant University research in Canada and internationally will be reviewed.

It will be necessary to relate to many Provincial and Federal Government departments and agencies including Health, Labour, Petroleum Directorate, Workers' Compensation Board, Medical Board, College of Fisheries, COCLA, Canadian Armed Forces, Coast Guard, etc. Other groups and individuals in the community will be contacted as necessary for consultation.

The plan for the study includes the following:

PHASE I

First three months (October, November, December) compilation of data currently available, and after initial study by consultants, advisors, and resource persons a preliminary report will be provided. This is primarily to ensure sharing of information and dovetailing with other appropriate studies of the Commission.

In the early weeks of the project Professor Norman would proceed with his studies and two other consultants from Europe (Norway and U.K.) will be involved.

PHASE II

January and February will see further research and discussions, with a meeting of several consultants in St. John's at the end of this period. A progress report would be made to the Commission shortly thereafter.

APPENDIX I

PHASE III

Further research and study will take place during March, April and May. Teleconferencing will be used wherever possible to ensure regular communications with consultants and others, and at the same time save travel funds.

PHASE IV

A progress report would be provided during June and the final report would be ready in September.

If feasible, it would be desirable for some of the activities of the project staff to take place in the Commission offices. This will facilitate exchange of information, encourage dovetailing with other studies and may result in some administrative and secretarial efficiencies.

The study will not deal with broad environmental and medico-sociological aspects of offshore exploration and production.

APPENDIX I

PROJECT TIME SCHEDULE

1982		1983	
PHASE I	PHASE II	PHASE III	PHASE IV
OCT., NOV., DEC.	JAN., FEB., MAR.	APR., MAY, JUNE	JULY, AUG., SEPT
Initial studies by project team and senior consultant. Briefing of consultants. (Compilation of data.) Initial report to Commission.	Continued research. Meetings with consultants and advisory group. Second report to Commission.	Further studies. Consideration of special questions arising during meetings in Phase II. Identification of main themes and recommendations. Third report to Commission.	Further contribution from consultants and resource people. Refinement of recommendations. Final project approval by group. Preparation of final report with submission in September.

- . Dr. T. Dobson, Medical Division, Workers' Compensation Board, Nova Scotia
- . Dr. Ernie Johnson, Medical Division, Workers' Compensation Board, Nova Scotia
- . Mrs. Joan Mills, Executive Director, Registered Nurses Association of Nova Scotia
- . Ms. Anna Taylor, Consultant, Registered Nurses Association of Nova Scotia

RESOURCE PERSONS - NEWFOUNDLAND MEDICAL ASSOCIATION

- . Dr. Ivan Woolfrey, President, Newfoundland Medical Association
- . Dr. Guy Hogan, Secretary, Newfoundland Medical Association
- . Mr. Gerry Lynch, Office Manager, Newfoundland Medical Association

SPECIAL ADVISORY GROUP - GOVERNMENT AND GOVERNMENT AGENCIES

- . Mr. John Parsons, Offshore Operations Consultant, Newfoundland Petroleum Directorate
- . Mr. Leo Brandon, Director General, Engineering and Control Branch, COGLA, Ottawa
- . Dr. Robert Williams, Associate Deputy Minister of Health and Safety, Department of Health, Government of Newfoundland and Labrador
- . Mr. Robert Langdon, Assistant Deputy Minister of Occupational Health and Safety, Department of Labour and Manpower, Government of Newfoundland and Labrador
- . Mr. Thomas Hamp, Engineering and Control Branch, COGLA, Ottawa
- . Dr. John Kirkbride, Occupational Health Unit, Medical Services Branch, Health and Welfare Canada
- . Dr. F.H. Hicks, Director, Health Advisory Services, Medical Services Branch, Health and Welfare Canada
- . Dr. C. Edwin Tupper, Director, Environmental Health Services, Health and Welfare Canada
- . Dr. J. Mercier, Senior Consultant, Occupational Medicine, Labour Canada
- . Dr. H.F. Mortimer, Consultant, Occupational Medicine, Occupational Health Unit, Medical Services Branch, Health and Welfare Canada
- . Dr. Thomas McCarthy, Consultant, Occupational Medicine, Occupational Health Unit, Medical Services Branch, Health and Welfare Canada

ADVISORY GROUP FROM INDUSTRY

- . Dr. W. G. Grisdale, Regional Medical Director, Mobil Oil Canada Limited, Calgary
- . Mr. Kenneth Oakley, Director of Office of Eastern Coast Petroleum Operators Association

APPENDIX II

- . Dr. Diane Dahlman, Medical Director, Esso Resources Limited
- . Dr. Cameron Hill, Medical Director, Petro Canada Limited
- . Dr. Don Johnston, Medical Director, Dome Petroleum Limited

LOCAL GENERAL PRACTITIONERS

- . Dr. Wayne O'Brien, Company Physician, Mobil Oil Canada Limited

LUXEMBOURG - NORWAY - U.K. VISIT - APRIL, 1983

- . Dr. Robin Cox, Medical Director, Phillips, Europe and Africa
- . Dr. Tor Nome, Medical Director, Phillips, Norway
- . Dr. Byrne, Director, Emergency Services, Rogaland Hospital
- . Dr. Douglas Bell, Senior Physician, Department of Health, Aberdeen
- . Dr. Ian Holle, Director, Health, Safety and Environment, British Petroleum Company
- . Dr. Michael Davies, Medical Director, British Petroleum Company Limited
- . Dr. Bertie Duck, Medical Director, British Petroleum Company Limited
- . Mr. Joe Cross, Training Officer, Robert Gordon Institute of Technology
- . Mr. M.J. Evans, Occupational Hygienist, Group Occupational Health Centre, British Petroleum Company Limited
- . Mr. A.A. Sparkes, Head of Technical, Management and Information Services, British Petroleum Company Limited
- . Dr. F.M.B. Carpanini, Senior Toxicologist, British Petroleum Company Limited

APPENDIX II

LIST OF INDIVIDUAL RESOURCES HAVING INPUT INTO THE STUDY WITHIN THE PERIOD JANUARY 1 - MARCH 31, 1983

SENIOR CONSULTANTS

- Professor Nelson Norman, University of Aberdeen, and Robert Gordon Institute of Technology, Aberdeen, Visiting Professor of Community Medicine, Memorial University of Newfoundland (teleconference)

CONSULTANTS

- Dr. C. Gordon Daugherty, Environmental and Occupational Medicine, Bay City, Texas (telephone)
- Dr. D. Colohan, Chairman Emergency Medicine, The General Hospital
- Dr. John Markham, Professor of Industrial & Environmental Medicine, University of Calgary
- Dr. Harry Edstrom, Associate Professor of Medicine, Faculty of Medicine, Memorial University of Newfoundland

ADVISORS

- Dr. James Holland, Professor Physiology, Dalhousie University
- * Dr. Wayne Snow, Company Physician, Petro Canada

MEMORIAL UNIVERSITY ADVISORS

- Dr. George Fodor, Associate Dean for Community Medicine and Behavioural Sciences, Faculty of Medicine, Memorial University
- Dr. C. Mellor, Professor and Chairman of Psychiatry, Faculty of Medicine, Memorial University
- Miss Margaret McLean, Director of Nursing, School of Nursing, Memorial University
- * Dr. G.R. Peters, Dean, Faculty of Engineering and Applied Science, Memorial University
- * Mr. Harold L. Snyder, Director, C-CORE, Memorial University

RESOURCE PERSONS - THE GENERAL HOSPITAL, ST. CLARE'S MERCY HOSPITAL

- Dr. Vinod Patel, Senior Casualty Officer, The General Hospital
- * Dr. Robert Bartlett, Casualty Office, The General Hospital
- * Mr. John Hearn, Administration, The General Hospital
- * Sister Mary Lucy Power, Executive Director, St. Clare's Mercy Hospital
- * Dr. Ian Tough, Medical Director, St. Clare's Mercy Hospital

OTHER ROYAL COMMISSION STUDY GROUPS

- . Captain Jack Strong - Study and Assessment of Operational Marine and Safety, Training for the Offshore Petroleum Industry and Related Sectors, College of Fisheries, Navigation, Marine Engineering and Electronics

LOCAL GENERAL PRACTITIONERS

- . Dr. Keith Noble, Company Physician, Sedco
- . Dr. Wayne O'Brien, Company Physician, Mobil Oil Canada Limited

ASSOCIATION OF REGISTERED NURSES OF NEWFOUNDLAND

- * Mrs. Gayle, Registrar, Association of Registered Nurses of Newfoundland
- * Mrs. V. Ruelokke, Executive Director, Association of Registered Nurses of Newfoundland
- * Mr. Robert Wells, Legal Counsel, Association of Registered Nurses of Newfoundland

UK VISIT MARCH 12-21, 1983

- * Mr. Steven Dick, General Manager, North Sea Medical Centre, Great Yarmouth, England
- * Dr. Ian Anderson, North Sea Medical Centre, Great Yarmouth, England
- * Dr. Evans, North Sea Medical Centre, Great Yarmouth, England
- * Dr. Nick McIver, North Sea Medical Centre, Great Yarmouth, England
- * Mr. Mathieson, Consultant Surgeon (in charge), Emergency Department, Aberdeen Royal Infirmary
- * Mr. Page, Consultant Surgeon, Emergency Department, Aberdeen Royal Infirmary
- * Mr. Webster, General Manager, Offshore Medical Support Ltd., Aberdeen
- * Dr. Morven White, Chevron Petroleum (UK) Ltd.
- * Dr. Thomas Fallowfield, Comex Holder Diving Ltd.
- * Dr. Bill Leese, Britoil Ltd.
- * Mr. Lfarry Bevan, International Underwater Contractors Ltd.
- * Mr. Crawford Jason, Seaforth Maritime Ltd.
- * Dr. M. E. Childs, Private Consultant in Diving Medicine, Aberdeen
- * Dr. Ivan Wisely, Aberdeen Industrial Doctors
- * Dr. Strackan, Aberdeen Industrial Doctors
- * Dr. Wilcox, Robert Gordon Institute of Technology, Aberdeen
- * Dr. Dingwell, Robert Gordon Institute of Technology, Aberdeen
- * Dr. Ellis, Robert Gordon Institute of Technology, Aberdeen
- * Dr. David Proctor, Director, Institute of Environmental and Offshore Medicine, University of Aberdeen

APPENDIX II

- * Dr. Colin Jones, Medical Director, BP Ltd.
- * Dr. Sandy Thain, Company Physician (Aberdeen), BP Ltd.
- * Mr. Nuttall, Senior Safety Officer, BP Ltd.
- * Mr. Ballingal, Offshore Installation Manager, North Sea, BP Ltd.

APPENDIX II

LIST OF CONSULTANTS, ADVISORS, AND RESOURCE PERSONS WHO ATTENDED STUDY MEETINGS WITHIN THE PERIOD SEPTEMBER 15 - DECEMBER 31, 1982

SENIOR CONSULTANTS

- Professor Nelson Norman, University of Aberdeen, and Robert Gordon Institute of Technology, Aberdeen, Visiting Professor of Community Medicine, Memorial University of Newfoundland

CONSULTANTS

- Dr. C. Gordon Daugherty, Environmental and Occupational Medicine, Bay City, Texas
- Dr. D. Colohan, Chairman Emergency Medicine, The General Hospital
- Dr. John Markham, Professor of Industrial & Environmental Medicine, Calgary
- Dr. Harry Edstrom, Associate Professor of Medicine, Faculty of Medicine, Memorial University of Newfoundland

ADVISORS

- Dr. Raymond Barrett, President, College of Fisheries, Navigation, Marine Engineering and Electronics
- Dr. James Holland, ^{Asst} Professor Physiology, Dalhousie University

MEMORIAL UNIVERSITY ADVISORS

- Dr. George Fodor, Associate Dean for Community Medicine and Behavioural Sciences, Faculty of Medicine, Memorial University
- Dr. Jorge Segovia, Associate Professor of Social Medicine, Faculty of Medicine, Memorial University
- Dr. C. Mellor, Professor and Chairman of Psychiatry, Faculty of Medicine, Memorial University
- Miss Margaret McLean, Director of Nursing, School of Nursing, Memorial University

RESOURCE PERSONS - THE GENERAL HOSPITAL

- Dr. Carl Robbins, Medical Director, The General Hospital
- Dr. Beverly Holt, Anaesthetist, The General Hospital
- Dr. Vinod Patel, Senior Casualty Officer, The General Hospital
- Dr. Martin Tweeddale, Internist, Director of Intensive Care Unit, The General Hospital

SPECIAL ADVISORY GROUP - GOVERNMENT AND GOVERNMENT AGENCIES

- Mr. Gordon Gosse, Assistant Deputy Minister, Government of Newfoundland and Labrador Petroleum Directorate
- Dr. W. David Parsons, Chairman of Newfoundland Medical Association Committee on Occupational and Environmental Medicine

APPENDIX II

- . Mr. Leo Brandon, Director General, Engineering Branch, COGLA, Ottawa
- . Mr. Robert Harvey, District Conservation Engineer, Labrador Shelf, Engineering and Control Branch, COGLA, St. John's
- . Dr. Robert Williams, Associate Deputy Minister of Health, Department of Health, Government of Newfoundland and Labrador
- . Mr. Robert Langdon, Assistant Deputy Minister of Occupational Health and Safety, Department of Labour and Manpower, Government of Newfoundland and Labrador
- . Dr. L. Lawton, Registrar, Newfoundland Medical Board, Senior Consultant, Workers' Compensation Board
- . Dr. Debbie Peckham, Medical Officer, Workers' Compensation Board

ADVISORY GROUP FROM INDUSTRY

- . Dr. Marvin D. Maxmen, Manager, Medical Services, BP Canada
- . ~ Dr. Diane Dahlman, Medical Director, Esso Resources Limited, Chairperson, East Coast Petroleum Operators Association Medical Advisory Committee
- . ~ Dr. Don Johnston, Director, Medical Services, Dome Petroleum Limited, Chairman, Calgary based oil company Medical Directors Group
- . Dr. Cowell, Vice President, Husky Oil, Nova Scotia
- . Dr. David Chisholm, Medical Director, Occupational Health, Shell Canada Resources Limited
- . Dr. David McDougall, Medical Director, Chevron Standard Limited
- . Dr. Cameron G. Hill, Medical Director, Human Resources Health Centre, Petro Canada
- . Dr. W. G. Grisdale, Regional Medical Director, Mobil Oil Canada Limited
- . Mr. Kenneth Oakley, Director of Office of Eastern Coast Petroleum Operators Association
- . Dr. J. Lovering, Medical Director, Gulf Canada

OTHER ROYAL COMMISSION STUDY GROUPS

- . Mr. Peter Underwood, Research Associate, Dalhousie Ocean Studies Program, Halifax
- . Captain Jack Strong - Study and Assessment of Operational Marine and Safety, Training for the Offshore Petroleum Industry and Related Sectors, College of Fisheries, Navigation, Marine Engineering and Electronics

LOCAL GENERAL PRACTITIONERS

- . Dr. Wayne Snow, Company Physician, Petro Canada
- . Dr. Keith Noble, Company Physician, Sedco
- . Dr. Wayne O'Brien, Company Physician, Mobil Oil Canada Limited
- . Dr. C. O'Shea, Diving Medicals Services

RESEARCH ASSOCIATE - ABERDEEN

- . Mr. John Brebner, Research Associate to Professor Nelson Norman, Aberdeen

APPENDIX 4-A

LEGISLATION RELATING TO HEALTH ASPECTS OF OFFSHORE OIL

INTRODUCTION

The relevant sections of Federal and Provincial legislation are listed here as a source of reference.

A. Federal

Office Consolidation of Canada Oil and Gas Drilling Regulations, PC 19 79-25, (amended by PC 1980-211, November 1980.) A review of this publication revealed the following regulations relating to health and safety:

- a. Safety devices and guard rails, section 32
- b. Medical and Rescue Facilities, section 35-36
- c. Lighting, section 40
- d. Firefighting systems including detectors and alarms, sections 45-47
- e. Internal combustion engines operations, section 50
- f. Ventilation of machinery rooms, section 53
- g. Diving operations, sections 58-59 and 146
- h. Blowout preventive requirements, sections 60-61
- i. Crane operations, section 134
- j. Safety and training of personnel is covered in extenso in part 5, pages 56-61
- k. Protection against hydrogen sulphide, section 153
- l. Accommodation standards (living quarters, food and potable water), section 168
- m. In 12 hours or less there must be 6 hours of rest between two successive shifts.

B. Provincial

1. Newfoundland and Labrador Petroleum Drilling Regulations, 1982, under the Petroleum and Natural Gas Act and the Occupational Health and Safety Act, OC 698-82, filed June 8, 1982.

The following sections refer to health and safety:

- a. Blowout prevention and well control equipment, sections 52-58
 - b. Safety with respect to oil flow, sections 118-120
 - c. Part 2, pages 92-97, Safety and training of personnel is covered in extenso
 - d. Medical and rescue facilities, section 187 (same as section 35 of Canada Oil and Gas Drilling Regulations, sections 35-36)
 - e. Lighting, section 209, subsections 1 and 2 - the same as in Canada Oil and Gas Drilling Regulations; subsection 3 in Newfoundland regulations only
 - f. Internal combustion engines, sections 213-214
2. Occupational Health and Safety Regulations, Department of Labour and Manpower, Province of Newfoundland, 1979.

The sections related to health and safety are:

- a. Thermal environment, section 10
- b. Ventilation, section 11
- c. Illumination, section 12
- d. Toilet facilities, section 13
- e. Washing facilities, section 14
- f. Laundry of work clothes, section 15
- g. Potable water, section 16
- h. Noise, section 31, subsections 5 and 8
- i. Criteria for permissible noise, ACGIH

COMMENT

All of these legislations are guidelines with two exceptions.

The Occupational Health and Safety Act, Newfoundland 1979 requires adherence to ACGIH standards for noise and to American National Standards Institute - Illuminating Society RP7-1979 for artificial illumination (Regulation March 25, 1983). The task of an inspector is facilitated if he can measure actual conditions against fixed regulatory standards. On the other hand fixed standards may be purely arbitrary and their enforcement requires extensive and time consuming inspection.

Portable suction device (foot operated)
Tracheostomy tubes, cuffed, sizes 5, 5.5 (cricothyroidotomy)
Scalpel, disposable, #11 blade (cricothyroidotomy)
Tracheal spreader, three pronged (cricothyroidotomy)
Hemostats (cricothyroidotomy)
Needle holder (cricothyroidotomy)
Scissors, Metzenbaum, suture (cricothyroidotomy)
Bridine surgical prep sticks
Syringe, plastic disposable 10cc
McSwain Dart chest tube kit with Heimlich valve
Tongue depressors
Cotton tip applicators (Q-tips)
Mouth gag
Automatic resuscitator (lung ventilator)
Mouth to mouth resuscitation tubes (Brooks type)

B. Cardiovascular System

EKG monitor/defibrillator
Spare EKG paper, electrodes, conductive gel
Indwelling venous catheters (catheter over needle) 14, 16, 18 gauge
Butterfly needle infusers (19, 21 gauge)
Intravenous infusion sets
 Macro drip (15 qtts/cc)
 Micro drip (60 qtts/cc)
Buretrol infusion chamber

Intravenous infusion solutions (1000 cc plastic bags)

0.9% Sodium chloride

5% Dextrose/water

5% Dextrose/0.45% normal saline

Hetastarch

Tourniquets

Medical Anti-shock Trousers

Sphygmomanometer (Aneroid)

Stethoscope

C. Gastrointestinal System

Nasogastric tubes 16 & 22 F

Orogastric lavage tubes 32 F

Catheter tip syringe 50cc

Gastric suction device (continuous and intermittent)

D. Urinary Tract

Foley catheters (30 cc balloon) 14 & 18 F

Urinometer/drainage bags

Urinals, plastic

Sterile gloves

Bridine prep solution

E. Musculoskeletal System

Stretchers

Blankets

Spine boards, long and short

Towels to pad spine boards

Straps, long and short, with parachute fasteners for spine boards

Cervical collars, semi-rigid: small, medium, large

Elastic bandages (ACE type) 2", 3", 6"

Elastic adhesive bandages, 2", 4"

Air splints

short arm, full arm

short leg, full leg

Femoral traction splint, Hare extrication or Thomas

Wooden rigid splints, assorted sizes

Triangular bandages

Aluminum finger splints, assorted sizes

Heavy-duty scissors

Hot water bottle

Wire splints

F. Integumentary System

Burn dressings

Impregnated gauze dressings (non-stick)

Cotton wook, sterile

Cotton balls, sterile

Sterile gauze, 4"x4", bulk pack

Kling bandages, 1", 2", 3", 6"

Paper tape closures, 1/8", 1/4", 1/2"

Butterfly closures

Band-aids, assorted sizes

Abdominal dressing pads

Waterproof underpads (Chux)

Sanitary napkins and belts

Tube gauze and applicator, 1", 2"

Dressing trays

Suture sets (disposable)

Safety pins, assorted sizes

Ring cutter

Magnifying light

Surgical scrub brushes

Disinfectant

Surgical prep solution

Face masks

Sterile gloves, sizes 7, 7½, 8

Needles, disposable, 25g 5/8", 21g 2"

G. Ear, Nose and Throat

Otoscope

Ear loop and foreign body forceps

Cotton balls

Q-tips

Ear syringe, irrigation

Epistaxis balloon catheter

Nasal speculum

Halogen headlight

Bayonet dressing forceps

Vaseline nasal pack

Whistle tip nasal suction catheter (metal)

Dental mirror

Dental probes

Dental extractors

H. Ophthalmology

Ophthalmoscope
Eye magnet
Eye pads and shields
Litmus (ph) paper
Fluorescein eye drops (unit dose)
Eye wash solution
Snellen eye chart
Corneal loupe
Eye loop
Eye Spud

I. Miscellaneous

Reflex hammer
Tuning fork
Autoclave
Needles, disposable 19g, 21g
Syringes, disposable (Insulin 3cc, 10cc, 20cc)
Bathtub with thermometer (hypothermia)
Thermometers, oral, hypothermia (Electronic with thermistor probe)
Kidney basins
Round bowls and basins
Bed pans
Adhesive tape (hypoallergenic) 1", 2", 3"
I.V. poles
Laboratory (Dextrometer, Hemoglobinometer, Dextrostix, Hemacombistix)
Flashlight with spare batteries & bulb
Tape measure

Surgical Equipment and Supplies

ITEM	DETAILS	QUANTITY
Scissors	Mayo, 7"	1
Scalpels	Disposable, No. 10 & 11 blades	1 each
Scalpel Blades	No. 10 & 11	2 each
Forceps, splinter		1
Minor Surgery Tray	Sterile, containing	
	Ribbon Retractor	1
	Army-Navy Retractor	2
	Rake Retractor sharp	1
	Rake Retractor blunt	1
	Lahey	2
	Mosquito	4
	Towel clips	6
	Needle driver	2
	Self-retaining retractor, blunt	1
	Allis	2
	Babcock	2
	Sponge forceps	2
	Scissors, straight Mayo	1
	Scissors, curved Mayo	1
	Scissors, curved Metz	1
	Artery (haemostat)	6
	Kockers	2
	Russian forcep	2

	Knife handle No. 3	1
	Knife handle No. 4	1
	Forceps, toothed	2
	Suction	1
Dressing Tray	Sterile, containing:	
	Small cup	1
	Combine pad	1
	Gauze 4 x 4	6
	Gauze 2 x 2	10
	Dressing towel	1
	Artery forceps	2
	Tissue forceps	1
Blood tubes (not vacutainers)	Silicone coated, no additive	2
Blood tubes (not vacutainers)	Non-silicone coated, EDTA	2
Sutures	silk, 3/0 on curved cutting needle	6
Sutures	silk, 0/0 on heavy curved needle	6
Sutures	chromic catgut, 2/0 on curved taper needle	6
Sutures	chromic catgut, 0/0 on curved taper needle	6
Ties	silk, 0/0	6
Ties	silk, 2/0	6
Ties	silk, 3/0	6
Sutures	Nylon, 3/0, 4/0, 5/0	2 each

J. Books

The Merck Manual, current edition

Compendium of Pharmaceuticals and Specialties: Canadian
Pharmaceutical Association

Ship's Captains Medical Guide

Supplies:

A. Respiratory System

Adrenalin 1 mg, 1 cc amp
Aminophylline 500 mg amp
Amoxicillin 500 mg caps
Diphenhydramine HCl 50 mg parenteral
Erythromycin ethyl succinate (EES) tabs 400 mg
Naloxone 0.4 mg amps
Pen V K tabs 300 mg
Penicillin parenteral (Bicillin A-P, 1,200,000 units)
Penicillin parenteral (Benzyl Penicillin)
Methylprednisolone Sodium Succinate 125 mg vial
Tetracycline tabs 500 mg
Salbutamol inhaler
Hydrocortisone Sodium Succinate 250 mg vial

B. Cardiovascular System

Diazoxide 300 mg amp
Hydrochlorothiazide tabs 50 mg
Isoproterenol 2 mg amp
Lanoxin 0.25 mg tabs
Lanoxin 0.5 mg amp
Lidocaine cardiac 100 mg preloaded
Lidocaine 1 gram cardiac vial
Nitrobid paste
Nitroglycerin tabs 0.3 mg
Procainamide 1 gram vial

Propranolol tabs 40 mg
Propranolol parenteral 1 mg amps
Sodium bicarbonate 50 meq/50 cc
Verapamil 5 mg amps
Furosemide parenteral 2 ml amps 20 mg

C. Central Nervous System

Morphine sulphate 1 ml amp (10 mg)
Chlorpromazine parenteral 2 cc amp (50 mg)
Chlordiazepoxide caps 25 mg
Chlordiazepoxide parenteral 100 mg amp
Dexamethasone 100 mg vial
Diazepam 5 mg tabs
Diazepam 10 mg preloaded carpoule
Cafergot P-B caps
Ergotamine tartarate sublingual
Ketamine HCl 200 mg vial
Dextrose 50% 50 cc preloaded
Mannitol 20% solution 1000 cc
Phenobarbital parenteral 200 mg amp
Phenytoin tabs 100 mg
Phenytoin parenteral 250 mg amp
Haloperidol tabs 5 mg
Haloperidol parenteral 10 mg amp
Prochlorperazine parenteral 10 mg amp
Demoral 100 mg carpoule
Triazolam 0.125 mg tabs

D. Gastrointestinal System

Activated Charcoal
Diban tabs
Dimenhydrinate tabs 50 mg
Dimenhydrinate parenteral 50 mg amps
Dimenhydrinate suppositories 50 mg
Fleet enema
Insulin, Toronto C.Z.I.
Maalox T.C.
Metoclopramide HCl tabs 10 mg
Syrup of Ipecac
Cimetidine tabs 300 mg
Transderm V (Scopolomine)

E. Urinary Tract

Ampicillin PRB single dose
Probenecid tabs 500 mg
Bactrim DS
Minocycline HCl 50 mg

F. Musculoskeletal

Acetaminophen tabs 325 mg
Entrophen 600 mg
Ethyl chloride spray

G. Integumentary

Alcohol swabs
Diphenhydramine HCl tabs 50 mg
Povidone-Iodine ung.

Povidone-Iodine solution

Bacitracin ung.

Hydrogen peroxide

Lindane lotion/shampoo

Kenacomb cream

Lidocaine local anesthetic, 1%, 2% without epinephrine

Tetanus toxoid, adult 0.5 cc

Tetanus immune globulin, human 250 and 500 units

Tolnaftate cream

Silver sulfadiazine cream 500 gm jar

Silver nitrate sticks

H. Ear, Nose and Throat

Auralgan

Cavit (temporary filling)

Anbesol toothache drops

Oil of cloves

Neomycin/Polymyxin/Hydrocortisone ear drops

Lidocaine viscous 5%

I Ophthalmology

Glycerol solution (acute Glaucoma)

Gentamycin oph. qtls/ung.

Neosynephrine oph. qtls 1/8%

Pilocarpine qtls 1%

Proparacaine HCl soln. 1/2%

Optrex eyewash

Sodium Sulphacetamide eye drops 10%

J. Miscellaneous

Progvanil tabs 100 mg

Chloroquine phosphate tabs 250 mg

Water for injections

Appendix 8-A

TASK LISTING FOR THE CANADIAN ARMED FORCES MEDICAL ASSISTANT TQ6A AND TQ6B

KEY

1. This Section specifies the task statements, the task involvement, and the levels required by personnel to qualify for entrance to each Trade Qualification (TQ) level. The coded format used is:

<u>TASK INVOLVEMENT</u>	<u>KNOWLEDGE</u>	<u>SKILL</u>
D - Do	b - Detailed	2 - Semi-skilled
DS - Do and Supervise	c - Comprehensive	3 - Skilled
S - Supervise	d - Complete	4 - Highly Skilled

- Notes:
1. The specified level of knowledge and skill states the minimum standard required for effective performance of each task.
 2. The minimum level of task involvement, knowledge and skill required for independent performance is "Db3".

*****NOTE ONLY THE SECTIONS OF THE KEY THAT REFER TO OUR CHARTS HAVE BEEN USED.*****

2. Definitions of task involvement, knowledge and skill are as follows:

a. Task Involvement

1. Do. Perform the task independently or under supervision. If the task is performed under supervision, the extent of supervision necessary can be determined by the level of knowledge and skill required to do the task.
2. Do and Supervise. Sometimes perform and other times supervise the task.
3. Supervise. Give orders or instructions followed up by personal observation and monitoring of the task to ensure compliance with standards.

b. Knowledge. In a specification, "knowledge" may refer to "subject" or "task statement" knowledge.

1. Detailed Knowledge. The knowledge required to perform the task efficiently. Personnel can -
 - a. explain the inter-relationship of basic facts, and

b. describe the general principles involved.

2. Comprehensive Knowledge. A wide scope of in depth knowledge of a particular field, or breadth of knowledge of a large number of related fields, theories, and techniques and procedures: or, a substantial amount of specialized information and extensive experience to cope with a diversity of situations. Personnel can explain -
 - a. why and when the task must be performed, and
 - b. the reason for each step.
3. Complete Knowledge. A thorough knowledge of the techniques and procedures particular to a sphere of activity and a firm understanding of its application in other fields of endeavor. This level of knowledge usually requires extensive training and experience.

NOTE

1. When writing a trade specification, it is strongly recommended that all "subject" knowledge be stated as a separate task statement or as a subparagraph to a task statement.

c. Skill

1. Semi-skilled. The level of performance achieved by obtaining sufficient theory and practice in the procedures concerned to complete a task under minimum supervision. Personnel -
 - a. can do most parts of the task, and
 - b. need help only on hardest parts of the task.
2. Skilled. This is the experienced, fully qualified level of independent performance carried out, under any condition, using the tools and equipment of the trade. Personnel who are skilled can -
 - a. do the complete task quickly and accurately, and
 - b. tell or show others how to do the task.
3. Highly Skilled. This is the top performance level of skill applied to the military environment. Usually, it can only be acquired by considerable training and practical experience, and by combining the highest degree of applied knowledge of specific functions with above average dexterity, coordination and accuracy of performance.

3. Interpretations Of Task Involvement, Knowledge and Skill

Level Codes. To assist personnel in assigning task involvement, and knowledge and skill level codes, the following guidelines are provided:

- a. Db2. Personnel qualified "Db2" have sufficient knowledge and skill to perform the task under minimum supervision, and
 - 1. can do most parts of the task,
 - 2. need help only on the hardest parts, and
 - 3. can determine step by step procedures for doing the task.
- b. Db3. Personnel qualified "Db3" have sufficient knowledge and skill to perform the task independently under any condition, and
 - 1. can explain the inter-relationship of the basic facts,
 - 2. describe the general principle involved,
 - 3. can do the complete task quickly and accurately,
 - 4. can tell or show others how to do the task,
 - 5. can analyze facts and principles, and
 - 6. draw conclusions about the subjects.
- c. DSb3. Personnel qualified "DSb3" have the same level of knowledge and skill as "Db3" with the additional requirement to supervise.
- d. DSc3. Personnel qualified "DSc3" have sufficient knowledge, skill, experience, and leadership training to -
 - 1. do all parts of the task,
 - 2. tell and show others how to do the task,
 - 3. explain the inter-relationship of each part of the task,
 - 4. analyze facts and principles,
 - 5. draw conclusions about the subject,
 - 6. predict, identify and resolve problems about the task, and
 - 7. evaluate conditions and make proper decisions about the subject.

TASK

TQ6A

TQ6B

Operations

Possesses a knowledge of anatomy, physiology, and pathology.

-c-

-d-

Provides nursing care for ambulatory and bed patients.	DSc3	DSd4
Provides intensive nursing care to patients on a ward or in an intensive care unit, or when classified as seriously or very seriously ill.	DSc3	DSd4
Provides care for psychiatric patients and participates actively as part of the mental health team.	DSc3	DSd3
Maintains a clean and complete patient unit including bed making and terminal cleaning.	DSd4	DSd4
Gives therapeutic baths to patients.	DSb3	DSb3
Applies the principles of body mechanics to lift, move and place a patient in a therapeutic position.	DSb4	DSb4
Observes, records and charts physical and mental states, vital signs, levels of consciousness and other signs indicating a patient's condition.	DSc3	DSd4
Keeps an accurate record of a patient's intake and output.	DSc4	DSc4
Inserts a gastric tube.	DSd3	DSd3
Performs urinary bladder catheterization.	DSc3	DSd4
Administers heat and cold treatments.	DSc3	DSc3
Carries out medical and surgical isolation techniques.	DSc3	DSd3
Prepares a body, after death, for transfer.	DSb3	DSb3

Maintains and replenishes medical supplies.	DSd3	DSd3
Interprets and implements a medical officer's medical orders.	DSc3	DSd4
Ensures that hospital standing orders and ward routines are complied with.	DSc4	DSc4
Inspects medical equipment routinely.	DSc3	DSc3
Administers enemata.	DSb3	DSb3
Performs admission and discharge routines of patients in medical establishments.	DSc3	DSc3
Prepares a patient for, and assists the medical officer with physical examinations, minor surgery and body aspirations.	DSc3	DSd4
Prepares a patient for laboratory and radiological examinations.	DSc3	DSd4
Performs electrocardiograms, audiograms, and routine eye testing.	DSc3	DSc3
Performs a physical examination, initiates patient's medical history, and makes a provisional diagnosis of injury or illness, when on independent duty.	Db2	Dd4
Treats minor illnesses and initiates treatments for acute illnesses and injuries, while on independent duty.	Db2	Dd4
Administers medications by topical, rectal, oral, and respiratory means (EXCEPT narcotics).	DSc3	DSd4
Gives intradermal injections.	DSc3	DSc3

Administers medications by subcutaneous and intramuscular injections (EXCEPT narcotics).	DSc3	DSc3
Interprets and fills medical prescriptions in accordance with the Surgeon General's policy.	DSc3	DSd3
Changes bottles or containers of already running intravenous solutions and plasma (EXCEPT blood transfusions).	DSc3	DSd3
Initiates and discontinues intravenous solutions or volume expanders (EXCEPT blood transfusions).	DSc3	DSd3
Conducts an immunization parade under the supervision of a medical officer.	DSc3	DSc3
Injects local anaesthetic solution, and sutures minor wounds.	Dc3	Dd4
Administers, controls and accounts for narcotic and controlled drugs in accordance with Canadian Forces Medical Orders.	Db3	Dc4
Maintains patients' nutritional needs.	DSc3	DSd4
Provides general nursing care for orthopaedic patients including immobilization and traction.	DSd3	DSd4
Prepares a patient for major surgery.	DSd3	DSd4
Provides care for patients in a recovery room.	DSd3	DSd4
Provides nursing care to surgical patients.	DSd3	DSd4
Provides nursing care to patients with eye, ear,	DSd3	DSd4

nose and throat injuries
and illnesses.

Cares for common dental emergencies and performs temporary repair of dentures, while on independent duty.	Dc2	Dc3
Carries out minor repair of eye glasses.	Db2	Db2
Obtains specimens of urine, stools, sputum, and samples for cultures; labels and forwards them to the laboratory.	DSb3	DSb3
Performs routine urinalysis.	DSb3	DSb3
Obtains a blood specimen by venepuncture.	DSc4	DSc4
Performs white blood count sedimentation rate and haemoglobin.	DSc3	DSd4
Prepares and stains urethral smears.	DSc3	DSc3
Performs microscopic examinations of blood, urine, stools, and other discharges.	Dc3	DSd4
Performs an occult blood test of stools.	Dc3	DSc3
Maintains a clear and safe environment for the patient.	DSc4	DSc4
Prepares and sterilizes material and equipment.	DSd3	DSd3
Prepares the operating room for surgery (or delivery) and performs post-operative cleaning procedures.	DSc3	DSc3
Acts as an assistant to the circulating nurse during major surgery.	Dc3	Dc3
Provides nursing care to	Dc3	Dc3

patients in the obstetrical, gynecological and pediatric departments.

Provides nursing care to newborn and premature infants.	Dc3	Dc3
Performs cardio-pulmonary resuscitation.	DSc3	DSd4
Performs initial treatment for a patient suffering from shock.	DSc3	DSd4
Performs initial treatment for a patient suffering from acute respiratory distress.	DSc3	DSd4
Operates a portable resuscitator, inhalator and aspirator.	DSd4	DSd4
Operates oxygen therapy equipment.	Dc3	DSd4
Performs initial treatment for a patient suffering from hemorrhage.	DSc3	DSd4
Performs initial treatment to the unconscious patient.	DSc3	DSd4
Performs initial treatment to a patient suffering from burns or cold injuries.	DSc3	DSd4
Performs initial treatment to a patient suffering from cerebro-spinal injuries.	DSc3	DSd4
Performs initial treatment to a patient suffering from wounds, injuries and fractures.	DSc3	DSd4
Initiates treatments of casualties resulting from poisons either inhaled or ingested.	DSc3	DSd4
Manages and supports patients with acute psychological disorders resulting from stress	DSc3	DSd3

and fatigue.

Possesses the knowledge to perform an emergency delivery.

-b-

-b-

Using tentage or existing structures, sets up an emergency and limited care medical facility.

DSc3

DSc3

Operates field lighting and heating equipment, in emergency and limited care medical facilities.

DSc3

DSc3

Retrieves casualties arising from hazardous situations specific to sea, land and air environments.

DSc3

DSc3

Performs initial treatment and prepares casualties for evacuation.

DSc3

DSd3

Modifies, prepares and adapts military vehicles for the transportation of casualties.

DSc3

DSc3

Cares for patients during evacuation.

DSd3

DSd4

Abides by the protocols of the Geneva Convention applicable to the military medical services.

-d-

-d-

Provides care for nuclear, biological and chemical warfare casualties.

DSb2

DSb3

Monitors and instructs Canadian Forces Medical Services (CFMS) personnel on personal hygiene.

DSc3

DSc3

Performs hygiene inspections and related preventive medicine duties.

DSc3

DSc4

Initiates, maintains and submits preventive medicine reports and returns.

DSc3

DSc4

Recognizes and treats common

DSc3

DSd4

communicable diseases and
infestations.

Performs casualty sorting and assigns priorities for treatment and evacuation.	Db2	Dc3
--	-----	-----

Knows the role and organization of the Canadian Forces Medical Service.	-b-	-b-
---	-----	-----

Observes medical ethics.	-c-	-c-
--------------------------	-----	-----

Possesses a knowledge of the medico-legal aspect of the trade.	-c-	-c-
---	-----	-----

Maintenance

Performs routine user maintenance and makes minor repairs to medical equipment.	Db2	Db2
---	-----	-----

APPENDIX 8-B

What is the purpose of this Program?

There are unique and challenging opportunities for nurses who are committed to meeting the health needs of people who live in rural and isolated areas where there is limited access to professional health care.

This program is designed to better prepare nurses to meet such responsibilities and to serve people living in Canada and throughout the world.

The Outpost Nursing Diploma A is comprised of two diplomas, B and C.

Students may elect to take Diploma B only, Diploma C only, or Diploma B & C together.

Course credits will be applied toward requirements for the degree of Bachelor of Nursing.

For detailed course descriptions, refer to the official University Calendar. For financial sponsorship, applicants should consult with their employer or the Director for Nursing Services, Grenfell Regional Health Services, St. Anthony, Newfoundland.

Diploma A

OUTPOST NURSING

Granted to students who complete both Diploma B and Diploma C.

Diploma B

COMMUNITY AND PRIMARY HEALTH CARE NURSING (10 credits)

Semester I and II

N2811 Community Nursing

N2830 Health Assessment & Management I

N2831 Health Assessment & Management II

N2840 Health Assessment & Management III

N2841 Health Assessment & Management IV

N3400 Communication and Nursing

N2820 Transcultural Health Care

Psychology 2010 or 2011

Sociology 2260

Business 2300

Clinical Field Experience

Diploma C

NURSE-MIDWIFERY (10 credits)

Fall Semester

N3810 Nurse-Midwifery I

N3820 Nurse-Midwifery II

N3830 Nurse-Midwifery III

N3840 Nurse-Midwifery IV

N2830 Health Assessment and Management I

Winter Semester

N480X Clinical Field Experience

January 1-June 30

Students who complete N2830 in Diploma B are required to complete one additional course approved by the Director of the School.

APPEND IX 8-C

RIG MEDICS REFRESHER COURSE

1. Introduction
General Practice Role Of The Rig Medic
2. History Taking
Examination, Assessment - Lecture Demonstration
3. Practical - Physical Examination
4. Management of Minor Ailments Offshore
5. Practical - BCLS/ACLS Refresher/Upgrading
6. Pain - Assessment & Control
7. Industrial Skin Disorders
8. Venereal Disease
9. Food Poisoning & Hygiene
10. Therapeutics In The Offshore Environment - Formulary
11. Psychiatric Emergencies Offshore
12. Drug & Alcohol Abuse
13. Casualty Handling & Communication
14. Triage & Disaster Management
15. Shock - Causes, Types, Management
16. Principles Of I/V Therapy
17. Practical - I/V Therapy
18. Wound Management - Wound Cleaning, Use Of Local Anaesthetic, Suturing
19. Practical - Wound Suturing

20. Hand Injuries - Assessment & Management
21. Eye Injuries - Assessment & Management
22. Facial Injuries - Assessment & Management
23. Cricothyrotomy
24. Chest Injuries
 Insertion of Intercostal Drainage Tubes
25. Central Nervous System Injuries
26. Acute Abdomen
27. Burns - Assessment & Management
28. Drowning & Hypothermia
29. Physics & Physiology Of Diving
30. Practical Orientation Air Dive (10 meters)
31. Nursing In The Hyperbaric Environment
32. Disorders Met In Diving Accidents
33. Ear, Nose & Throat Problems in Diving
34. Decompression Sickness - Assessment & Management
35. Compressed Gas Embolism

Final Course Examination

Source: Centre for Offshore and Remote Medicine, Memorial University of Newfoundland, Rig Medic Refresher Course Outline, June & November 1983.

FIRST AID COURSE FOR OFFSHORE WORKERS

<u>TIME</u>	<u>SESSION</u>	<u>CONTENT</u>
8 hours	St. John Ambulance Emergency Safety Oriented First Aid Course (SOFA)	<ul style="list-style-type: none"> - Introduction to course - Respiratory emergencies - Artificial respiration - Control of bleeding - Dressings and bandages - Shock - Internal bleeding - Fractures, dislocations and sprains - Chest, abdominal and pelvic injury - Head, neck and back injuries - Burns - Eye injuries - Illnesses due to extremes of heat and cold - Handling and moving casualties - Poisoning - Choking - Casualty management - Review (workbook and practical exercise) of artificial respiration and control of bleeding - Evaluation for certification - Miscellaneous emergencies, workbook exercise dealing with: acute heart attacks, stroke, diabetic emergencies, epileptic seizures, fainting, bleeding from the nose.
9 hours	CPR	<ul style="list-style-type: none"> - Cardiopulmonary Resuscitation (CPR) - This eight-hour Basic Life Support course is delivered in one day (through contractual services of agencies such as the Canadian Red Cross or the St. John Ambulance) <p>CPR is an emergency procedure that requires special training to recognize firstly, cardio-pulmonary arrest and to then perform artificial ventilation and circulation procedures. The CPR course being offered in the BOST course deals with the practical application of this knowledge according to the recommended standards of the Canadian Heart Foundation (CHF).</p>

<u>TIME</u>	<u>SESSION</u>	<u>CONTENT</u>
	CPR (cont'd)	<p>The course includes:</p> <ul style="list-style-type: none">- Review of:<ul style="list-style-type: none">(1) Background material(2) New methods (Participants will have received material prior to the course)- Supervised practice with a mannikin- Certification examination:<ul style="list-style-type: none">(1) Post-course exam for 85% proficiency(2) Performance test on mannikins to pass all sequences as required by the CHF for:<ul style="list-style-type: none">(a) one-rescuer CPR(b) two-rescuer CPR(c) obstructed airway in the conscious and unconscious victim(d) any other practical aspects of the course as required by the instructor
2 hours	Hypothermia	<ul style="list-style-type: none">- Cold water survival

Source: Basic Offshore Safety Training Course Outline, College of Fisheries, Navigation, Marine Engineering and Electronics, Fall, 1983.

APPENDIX 9-B

COMPETENCE REQUIREMENTS
AND CURRICULUM GUIDELINES
FOR
EDUCATIONAL PROGRAMS
FOR EMERGENCY MEDICAL ATTENDANTS
(LEVELS I, II, AND III)

ESTABLISHED BY

THE CONJOINT COMMITTEE ON ACCREDITATION

OF EDUCATIONAL PROGRAMS FOR

EMERGENCY MEDICAL ATTENDANTS

APRIL, 1982

TABLE OF CONTENTS

	<u>PAGE</u>
COMPETENCE REQUIREMENTS AND CURRICULUM GUIDELINES FOR EDUCATIONAL PROGRAMS FOR EMERGENCY MEDICAL ATTENDANTS	1
INTRODUCTION	1
NEED FOR ACCREDITATION	1
HOW ACCREDITATION WORKS	1
LEVELS OF ACCREDITATION AND TITLES FOR WORKERS	3
ORGANIZATION OF THIS DOCUMENT	4
CHAPTER 1: MINIMUM COMPETENCY REQUIREMENTS - LEVEL I EMERGENCY MEDICAL ATTENDANT PROGRAMS	5
INTRODUCTION	6
NEED FOR LEVEL I EMA	6
ROLE DESCRIPTION: EMERGENCY MEDICAL ATTENDANT I	7
SCOPE AND FUNCTION	7
REQUIREMENTS FOR ACCREDITATION	9
CURRICULUM AND PERFORMANCE OBJECTIVES COMPRISING LEVEL I COMPETENCY REQUIREMENTS	11

	<u>PAGE</u>
CHAPTER 2:	
MINIMUM COMPETENCY REQUIREMENTS	
LEVEL II EMERGENCY MEDICAL ATTENDANT PROGRAMS	24
INTRODUCTION	25
NEED FOR LEVEL II	25
ADDITIONAL DEPTH AND NEW	
RESPONSIBILITIES	25
REQUIREMENTS FOR ACCREDITATION	26
CURRICULUM AND PERFORMANCE OBJECTIVES	
COMPRISING LEVEL II COMPETENCY	
REQUIREMENTS	27
(A) DIDACTIC	27
(B) IN-HOSPITAL CLINICAL	49
(C) ON-CAR PRACTICUM	49
CHAPTER 3:	
MINIMUM COMPETENCY REQUIREMENTS	
LEVEL III EMERGENCY MEDICAL ATTENDANT PROGRAMS	50
INTRODUCTION	51
NEED FOR LEVEL III	51
DELEGATED MEDICAL RESPONSIBILITIES	51
REQUIREMENTS FOR ACCREDITATION	51
STUDENT SELECTION	51
REQUIRED COMPETENCES	53
MAJOR LEVEL III PROGRAM COMPONENTS	53

CURRICULUM AND PERFORMANCE OBJECTIVES	
COMPRISING LEVEL III COMPETENCY	
REQUIREMENTS	54
(A) DIDACTIC COMPONENT	54
(B) CLINICAL (IN-HOSPITAL) TRAINING	62
(C) PRACTICAL (ON-CAR) TRAINING	65
INTER-RELATEDNESS OF PROGRAM COMPONENTS	65
SUGGESTIONS FOR STUDENT EVALUATION	66
CONTINUING EDUCATION	67

COMPETENCE REQUIREMENTS
AND CURRICULUM GUIDELINES
FOR EDUCATIONAL PROGRAMS FOR
EMERGENCY MEDICAL ATTENDANTS

INTRODUCTION

NEED FOR ACCREDITATION

THE QUALITY OF PRE-HOSPITAL EMERGENCY CARE AVAILABLE CAN MAKE THE DIFFERENCE BETWEEN LIFE AND DEATH FOR INDIVIDUAL VICTIMS OF ACCIDENT OR ILLNESS. EMERGENCY MEDICAL ATTENDANTS, WORKING AS EXTENSIONS OF THE HOSPITAL'S EMERGENCY DEPARTMENT, ARE ESSENTIAL PRACTITIONERS WHOSE TRAINING AND LEVEL OF SKILL HAS VARIED CONSIDERABLY FROM PROVINCE TO PROVINCE. THE ESTABLISHMENT OF NATIONAL ACCREDITATION FOR EDUCATIONAL PROGRAMS FOR EMERGENCY MEDICAL ATTENDANTS PROMOTES THE DEVELOPMENT OF QUALITY EDUCATION AND OF COMMON MINIMUM LEVELS OF COMPETENCE FOR EMA'S ACROSS CANADA.

HOW ACCREDITATION WORKS

ACCREDITATION IS THE FORMAL RECOGNITION OF AN INDIVIDUAL EDUCATIONAL PROGRAM THAT HAS MET MINIMUM REQUIREMENTS SPECIFIED BY THE NATIONAL CONJOINT COMMITTEE. REQUIREMENTS ARE SPECIFIED FOR EACH OF LEVELS I, II, AND III. GRADUATES OF PROGRAMS ACCREDITED AT A PARTICULAR LEVEL CAN BE EXPECTED TO PERFORM COMPETENTLY THOSE DUTIES INCLUDED IN THE REQUIREMENTS FOR THAT LEVEL.

REQUIREMENTS FOR ACCREDITATION, INCLUDING SPECIFIC COMPETENCES RELATED TO EACH LEVEL, ARE ESTABLISHED BY THE CONJOINT COMMITTEE ON ACCREDITATION, WHICH INCLUDES REPRESENTATION FROM THE CANADIAN MEDICAL ASSOCIATION, THE CANADIAN ASSOCIATION OF EMERGENCY PHYSICIANS, THE CANADIAN ASSOCIATION OF AMBULANCE PERSONNEL (CURRENTLY AN AD HOC ASSOCIATION SEEKING A NATIONAL CHARTER) AND THE ASSOCIATION OF CANADIAN COMMUNITY COLLEGES. THE COMMITTEE HAS INVOLVED OBSERVERS AND/OR RECEIVED COMMENT FROM A NUMBER OF OTHER ASSOCIATIONS AND SOCIETIES, INCLUDING THE ST. JOHN AMBULANCE, THE CANADIAN FORCES, THE CANADIAN SKI PATROL SYSTEM, PROVINCIAL AMBULANCE ORGANIZATIONS, CMA'S PROVINCIAL DIVISIONS AND SEVERAL MUNICIPAL AMBULANCE ORGANIZATIONS.

THE MEDICAL PROFESSION RECOGNIZES THE ACCREDITATION PROCESS AS A NATIONAL MECHANISM THAT PROMOTES MINIMUM EDUCATIONAL STANDARDS AND PROVIDES AN EXPERT FORUM FOR ON-GOING REVIEW OF MINIMUM COMPETENCES REQUIRED BY PRACTITIONERS IN THE FIELD. RECOMMENDATIONS FROM THE CONJOINT COMMITTEE MAY BE CONSIDERED BY CMA'S COMMITTEE ON ALLIED HEALTH AND RECOMMENDED THROUGH CMA'S BOARD OF DIRECTORS TO GENERAL COUNCIL. CMA'S GENERAL COUNCIL HAS APPROVED THE THREE LEVELS OF EMERGENCY MEDICAL ATTENDANT UPON WHICH ACCREDITATION REQUIREMENTS ARE BASED. CMA'S GENERAL COUNCIL HAS ALSO ENDORSED THE PRINCIPLE THAT SPECIFIC IDENTIFIED MEDICAL ACTS MAY BE PERFORMED BY EMA'S UNDER SUPERVISION BY RADIO OR TELEMETRY. IT SHOULD BE STRESSED THAT THE COLLEGE OF PHYSICIANS AND SURGEONS IN EACH PROVINCE IS RESPONSIBLE FOR IDENTIFYING MEDICAL ACTS WHICH MAY BE DELEGATED IN THEIR INDIVIDUAL PROVINCE. NATIONAL ACCREDITATION REQUIREMENTS HAVE TAKEN SPECIFIC REQUIREMENTS OF THE PROVINCIAL COLLEGES INTO ACCOUNT, BUT INDIVIDUAL PROGRAMS AND AUTHORITIES REMAIN RESPONSIBLE

FOR ENSURING FULL COMPLIANCE WITH THE POLICY OF THE PROVINCIAL COLLEGES.

EDUCATIONAL PROGRAMS WHICH SEEK TO BE ACCREDITED MUST MEET REQUIREMENTS AS SPELLED OUT IN:

1. THE BASIS OF ACCREDITATION (AVAILABLE FROM THE COORDINATOR, CONJOINT COMMITTEE ON ACCREDITATION OF EDUCATIONAL PROGRAMS FOR EMERGENCY MEDICAL ATTENDANTS, CMA HOUSE, P.O. Box 8650, OTTAWA, ONTARIO K1G 0G8);
2. "COMPETENCE REQUIREMENTS AND CURRICULUM GUIDELINES FOR EDUCATIONAL PROGRAMS FOR EMERGENCY MEDICAL ATTENDANTS" (THIS DOCUMENT).

APPLICATION FORMS AND INSTRUCTIONS FOR PROGRAMS SEEKING TO BE ACCREDITED ARE AVAILABLE FROM THE COMMITTEE COORDINATOR AT THE ABOVE ADDRESS. FOLLOWING CONJOINT COMMITTEE REVIEW OF APPLICATION FORMS AND SUPPORTING DOCUMENTATION, ON-SITE ACCREDITATION SURVEYS ARE ARRANGED; A TEAM OF PHYSICIANS, EMERGENCY MEDICAL ATTENDANTS, AND EDUCATORS, VISITS THE INDIVIDUAL PROGRAM, REVIEWS ARRANGEMENTS, AND VERIFIES INFORMATION RECEIVED. PROGRAMS MAY BE RECOMMENDED FOR ACCREDITATION FOR A FULL TERM OF FIVE (5) YEARS, RECEIVE PROVISIONAL ACCREDITATION REQUIRING CORRECTION OF PROGRAM DEFICIENCIES, OR MAY BE DENIED ACCREDITATION. DETAILS ON CATEGORIES OF ACCREDITATION ARE PRESENTED IN THE BASIS OF ACCREDITATION.

LEVELS OF ACCREDITATION AND TITLES FOR WORKERS

THREE LEVELS OF PROGRAM ACCREDITATION HAVE BEEN ESTABLISHED TO COINCIDE WITH PROGRAMS FOR BASIC,

INTERMEDIATE AND ADVANCED EMERGENCY MEDICAL ATTENDANTS.
REQUIRED COMPETENCES FOR EACH LEVEL ARE IDENTIFIED IN
INDIVIDUAL CHAPTERS OF THIS DOCUMENT.

EMERGENCY MEDICAL ATTENDANT IS A TITLE WHICH CAN APPLY TO
PRACTITIONERS QUALIFIED BY GRADUATION FROM ACCREDITED
PROGRAMS AT ANY OF THE THREE LEVELS. IT IS RECOMMENDED
IN PREFERENCE TO "AMBULANCE ATTENDANT" OR OTHER TITLES
WHICH MAY BE IN USE. THERE ARE THREE DISTINCT LEVELS OF
COMPETENCE, HOWEVER:

EMERGENCY MEDICAL ATTENDANTS (GENERAL TERM)

GRADUATES]	LEVEL I: EMERGENCY MEDICAL ATTENDANT
FROM		
ACCREDITED		LEVEL II: EMERGENCY MEDICAL ATTENDANT
PROGRAMS		LEVEL III: EMERGENCY MEDICAL ATTENDANT

ORGANIZATION OF THIS DOCUMENT

MINIMUM COMPETENCY REQUIREMENTS AND CURRICULUM GUIDELINES
FOR:

CHAPTER 1	LEVEL I EMA PROGRAMS	PAGE 5
CHAPTER 2	LEVEL II EMA PROGRAMS	PAGE 24
CHAPTER 3	LEVEL III EMA PROGRAMS	PAGE 50

CHAPTER 1

MINIMUM COMPETENCY REQUIREMENTS

LEVEL I EMERGENCY MEDICAL ATTENDANT PROGRAMS

PREPARED FOR THE

CONJOINT COMMITTEE ON ACCREDITATION

OF EDUCATIONAL PROGRAMS FOR

EMERGENCY MEDICAL ATTENDANTS

MAY 1980

INTRODUCTION

NEED FOR LEVEL I EMA

EFFECTIVE PRE-HOSPITAL EMERGENCY CARE REQUIRES PROPERLY TRAINED BASIC EMERGENCY MEDICAL ATTENDANTS. THE SCOPE OF DUTIES FOR SUCH WORKERS AND EDUCATIONAL PROGRAMS TO PREPARE THEM HAVE VARIED ACROSS CANADA. ACCREDITATION WILL ENCOURAGE THE DEVELOPMENT OF COMPARABLE STANDARDS AND CONTRIBUTE TO:

1. PORTABILITY OF EMA'S;
2. ABILITY OF EDUCATORS TO IDENTIFY RECIPROCAL EDUCATIONAL CREDIT;
3. ABILITY OF RESEARCHERS TO COMPARE DATA ON PRE-HOSPITAL CARE PROGRAMS;
4. MORE CONVENIENT VALIDATION OF QUALITY OF PRE-HOSPITAL EMERGENCY PATIENT CARE;
5. MORE CONSISTENT RECOGNITION OF PRE-HOSPITAL EMERGENCY PATIENT CARE PROVIDERS BY THE MEDICAL COMMUNITIES.

THE EMERGENCY MEDICAL ATTENDANT (LEVEL I), WHO HAS GRADUATED FROM AN ACCREDITED PROGRAM, IS A PRE-HOSPITAL EMERGENCY CARE WORKER CAPABLE OF COMPETENT PERFORMANCE OF THOSE LIFE SUPPORT SKILLS DESCRIBED IN THE FOLLOWING CHAPTER.

ROLE DESCRIPTION: EMERGENCY MEDICAL ATTENDANT I

GRADUATES OF THE PROGRAM WILL DEMONSTRATE BASIC COMPETENCE IN THE FOLLOWING AREAS:

- A. BE ABLE TO RECOGNIZE A HUMAN CRISIS OF A PHYSIOLOGICAL OR PSYCHOLOGICAL NATURE AND ACCURATELY EVALUATE MAINTENANCE/IMPROVEMENT/DETERIORATION OF A GIVEN PATIENT'S CONDITION;
- B. BASED UPON INFORMATION GATHERED, BE ABLE TO IDENTIFY THE MOST APPROPRIATE COURSE OF PHYSIOLOGICAL AND/OR PSYCHOLOGICAL MANAGEMENT TO FOLLOW FOR A GIVEN PATIENT'S CONDITION;
- C. BE ABLE TO COLLECT, EVALUATE AND ACCURATELY REPORT VERBALLY AND IN WRITING THE PERTINENT INFORMATION CONCERNING ALL ASPECTS OF A GIVEN PATIENT'S CONDITION;
- D. BE ABLE TO UNDERSTAND AND DEMONSTRATE APPROPRIATE USE OF AND CARE FOR ALL EQUIPMENT REQUIRED TO ACCOMPLISH HIS/HER JOB.

SCOPE AND FUNCTION

IN ADDITION TO THE SKILLS AND KNOWLEDGE RECOGNIZED AS FIRST AID MEASURES, EMA I GRADUATES WILL DEMONSTRATE THE NECESSARY KNOWLEDGE AND SKILLS TO PROVIDE:

- HEALTH CRISIS SCENE ASSESSMENT AND MANAGEMENT
- PRIMARY PATIENT SURVEY OF A PERSON UNDERGOING A HEALTH CRISIS
- MAINTENANCE OF PATENCY OF THE UPPER AIRWAY, INCLUDING USE OF OROPHARYNGEAL AIRWAY ADJUNCTS
- ADMINISTRATION OF OXYGEN AND BASIC MANAGEMENT OF BREATHING DYSFUNCTIONS

- RECOGNITION OF EXTERNAL AND INTERNAL HEMORRHAGE AND APPLICATION OF BASIC MANAGEMENT TECHNIQUES
- SECONDARY PATIENT SURVEY OF A PERSON UNDERGOING A HEALTH CRISIS
- APPROPRIATE PSYCHOLOGICAL SUPPORT MEASURES TO A PATIENT UNDERGOING A HEALTH CARE CRISIS
- BASIC CARE MEASURES FOR GIVEN WOUNDS AND ENVIRONMENTAL INJURIES
- APPROPRIATE IMMOBILIZATION TECHNIQUES FOR ACTUAL OR SUSPECTED FRACTURES
- APPROPRIATE BASIC MANAGEMENT TECHNIQUES FOR GIVEN MEDICAL DISORDERS SUCH AS, BUT NOT LIMITED TO, EPILEPSY, DIABETES, AND CARDIOVASCULAR DISORDERS
- APPROPRIATE MANAGEMENT TECHNIQUES FOR USE WITH EMERGENCY CHILDBIRTH, INCLUDING POSTNATAL, MATERNAL AND NEONATAL CARE AND TRANSPORT
- APPROPRIATE MANAGEMENT TECHNIQUES FOR USE WITH A PATIENT UNDERGOING EMOTIONAL AND/OR A POSSIBLE MENTAL HEALTH CRISIS
- APPROPRIATE PATIENT EXTRICATION, PACKAGING AND TRANSPORT TECHNIQUES
- LIFTING AND MOVING TECHNIQUES (BIOMECHANICS) ESSENTIAL TO APPROPRIATE PATIENT CARE AND GRADUATE SAFETY
- SAFE OPERATION OF AN AMBULANCE VEHICLE IN ACCORDANCE WITH THE NEEDS OF THE PATIENT AND THE SAFETY OF THE PUBLIC AT LARGE
- ACCURATE COLLECTION AND REPORTING OF PERTINENT PATIENT INFORMATION ORALLY AND IN WRITING
- APPROPRIATE USE OF AND CARE FOR ALL EQUIPMENT AND/OR APPARATUS REQUIRED TO ACCOMPLISH HIS/HER PATIENT CARE FUNCTIONS

REQUIREMENTS FOR ACCREDITATION

PROGRAM REQUIREMENTS

PROGRAMS SEEKING ACCREDITATION MUST INCLUDE TRAINING OBJECTIVES SPECIFIED AND BE ABLE TO DEMONSTRATE THAT THEY INCLUDE ALL ACADEMIC AND CLINICAL PERFORMANCE COMPONENTS NECESSARY TO PRODUCE COMPETENT QUALIFIED PRACTITIONERS.

OTHER DETAILED REQUIREMENTS RELATED TO PROGRAM ADMINISTRATION, POLICY AND FACILITIES ARE LISTED IN THE BASIS OF ACCREDITATION.

A MODULAR APPROACH

THE MODULES PRESENTED HERE IDENTIFY REQUIRED SKILLS AND KNOWLEDGE COMPONENTS IN CONVENIENT UNITS. APPROXIMATE TEACHING TIMES ARE INCLUDED IN EACH MODULE FOR GUIDANCE AS TO THE COMPLEXITY OR DEPTH OF TEACHING. THEY ARE SUGGESTED HOURS ONLY, AND NEED NOT BE RIGIDLY FOLLOWED. THE ACCREDITATION PROCESS WILL FOCUS ON WHETHER OR NOT REQUIRED COURSE OBJECTIVES ARE INCLUDED AND WHETHER ARRANGEMENTS ARE SUCH THAT THEY MAY BE SUCCESSFULLY ACHIEVED, RATHER THAN ON MECHANICAL COMPLIANCE WITH ALLOTTED HOURS.

THE ASSESSMENT OF KNOWLEDGE AND SKILLS MUST BE BASED ON BOTH ACADEMIC AND CLINICAL PERFORMANCE, THE LATTER IN BOTH SIMULATED AND REAL SITUATIONS WHENEVER POSSIBLE.

THE OVERALL REQUIREMENTS FOR LEVEL I WHICH FOLLOW COLLECTIVELY MAKE UP A SUGGESTED CURRICULUM FOR A LEVEL I PROGRAM WHICH MEETS OVERALL REQUIREMENTS. TOPICS AND SKILLS INDICATED MUST BE INCLUDED IN THE CURRICULUM

OF AN ACCREDITED PROGRAM BUT PROGRAMS CAN ORGANIZE THEIR COURSE PATTERN DIFFERENTLY AND EVEN INTRODUCE ADDITIONAL MATERIAL (WHERE PERMITTED BY LOCAL AUTHORITIES) AND STILL BE ELIGIBLE FOR ACCREDITATION. ACCREDITATION SEEKS TO ENSURE THAT PROGRAMS INCORPORATE ALL BASIC REQUIREMENTS AND TO PERMIT LOCAL FLEXIBILITY IN TERMS OF COURSE ARRANGEMENT AND METHODOLOGY.

DETAILED TERMINAL OBJECTIVES WHICH COLLECTIVELY MAKE UP LEVEL I COMPETENCY REQUIREMENTS MUST BE INCLUDED IN ACCREDITED PROGRAMS. THESE ARE DESCRIBED IN THE FOLLOWING SECTION.

CURRICULUM AND PERFORMANCE OBJECTIVES
COMPRISING LEVEL I COMPETENCY REQUIREMENTS

UPON COMPLETION OF THE EMERGENCY MEDICAL ATTENDANT
LEVEL 1 PROGRAM, THE STUDENT WILL BE ABLE TO DEMONSTRATE
THE FOLLOWING NECESSARY KNOWLEDGE AND SKILLS:

1. INTRODUCTION TO AMBULANCE AND EMERGENCY CARE
LEVEL 1 (2 HOURS)

OVERVIEW OF COURSE OBJECTIVES, SCOPE, ROLES AND
RESPONSIBILITIES OF THE STUDENT'S METHODS OF EVALU-
ATION, PROGRAM STRUCTURE AND INSTRUCTIONAL
STRATEGY.

2. MEDICAL TERMINOLOGY (3 HOURS)

AN INTRODUCTION TO THE MEDICAL TERMS COMMONLY USED
IN PRE-HOSPITAL PATIENT CARE, INCLUDING DEFINITIONS
AND THE MEANING OF VARIOUS PREFIXES, SUFFIXES, AND
ROOTS (EITHER TAUGHT SEPARATELY, OR INTEGRATED INTO
THE REMAINDER OF THE PROGRAM).

3. SCENE EVALUATION AND TRIAGE (2 HOURS)

REQUIREMENTS FOR A PRE-HOSPITAL CARE PROVIDER WHO
IS APPROACHING THE SCENE OF AN EMERGENCY. THE
PROGRAM SHOULD COVER THE FOLLOWING: SIGHT REVIEW,
RESCUER AND PATIENT SAFETY, METHODS OF GAINING
ACCESS AND PRINCIPLES OF RATIONAL TRIAGE OF PATIENTS
ACCORDING TO THE PRIORITY OF THE PATIENT AND THE
STATUS OF THE OVERALL SITUATION.

4. PATIENT ASSESSMENT (4 HOURS)

BASIC SKILLS FOR CONDUCTING A PRIMARY SURVEY FOR
AIRWAY PATENCY, BREATHING QUALITY AND QUANTITY, AND

CIRCULATORY SYSTEM FUNCTION AND INTEGRITY, OBTAINING PATIENT'S VITAL PHYSIOLOGICAL SIGNS, INCLUDING PULSE, RESPIRATIONS; BLOOD PRESSURE, PUPILLARY SIZE AND REACTION, TEMPERATURE, SKIN CONDITION AND RESPONSE TO STIMULI; CONDUCTING A FULL BODY SURVEY THROUGH VISUAL OBSERVATION AND PALPATION ON A COMMUNICATIVE AND NON-COMMUNICATIVE PATIENT.

5. PRACTICE - PATIENT ASSESSMENT AND VITAL SIGNS
(3 HOURS)

GIVEN A SIMULATED COMMUNICATIVE AND NON-COMMUNICATIVE PATIENT (OR MANIKIN) DEMONSTRATE THE FOLLOWING SKILLS: PERFORMING A PRIMARY SURVEY, TAKING AND EVALUATING VITAL SIGNS; CONDUCTING A (FULL BODY) SURVEY SECONDARY ASSESSMENT.

6. COMMUNICATIONS (3 HOURS)

A COMPONENT TO ENSURE THAT THE GRADUATE SHALL BE ABLE TO COMMUNICATE ACCURATELY, BOTH ORALLY AND IN WRITING, FACTS THAT ARE RELEVANT TO HISTORY-TAKING, ASSESSMENT AND MANAGEMENT OF SPECIFIC PATIENTS, I.E.: UNDER SIMULATED AND/OR CLINICAL SITUATIONS, GATHER AND RECORD RELEVANT DATA CONCERNING A GIVEN PATIENT; APPROPRIATELY DOCUMENT PATIENT ASSESSMENT; DESCRIBE THE MEDICO-LEGAL CONSIDERATIONS APPROPRIATE TO DOCUMENTATION OF PATIENT ASSESSMENT; DEMONSTRATE ACCURATE VERBAL AND WRITTEN COMMUNICATION OF RELEVANT FACTS ON THE ASSESSMENT AND MANAGEMENT OF SPECIFIC PATIENTS.

7. AIRWAY OBSTRUCTION AND CESSATION OF BREATHING
(4 HOURS)

BASIC UNDERSTANDING OF THE STRUCTURE, PURPOSE AND FUNCTION OF THE RESPIRATORY SYSTEM; SIGNS AND SYMPTOMS OF AIRWAY OBSTRUCTION AND CESSATION OF BREATHING; MAINTAINING A PATENT AIRWAY; ARTIFICIAL

VENTILATION BY MANUAL AND MECHANICAL MEANS; VARIATIONS TO BE APPLIED FOR INFANTS, CHILDREN AND LARYNGECTOMIES; MAINTENANCE AND USE OF AIRWAYS; MAINTENANCE AND USE OF SUCTION EQUIPMENT; MAINTENANCE AND USE OF OXYGEN EQUIPMENT AND ADMINISTRATION SYSTEMS; MAINTENANCE AND USE OF MANUAL RESUSCITATION DEVICES.

8. THORACIC TRAUMA (5 HOURS)

BASIC UNDERSTANDING OF: THE STRUCTURE, PURPOSE, AND FUNCTION OF THE THORAX AND ITS INTERNAL BODIES; SIGNS AND SYMPTOMS OF RESPIRATORY EMBARRASSMENT DUE TO LOSS OF THORACIC WALL INTEGRITY; ASSESSMENT CRITERIA FOR PATIENTS SUFFERING THORACIC WALL TRAUMA, INCLUDING, BUT NOT LIMITED TO: AIR ENTRY, SYMMETRY, TENDERNESS, AUSCULTATION, PALPATION, PULSE RATE, (RHYTHM AND VOLUME), COLOUR, RESPIRATORY RATE, (RHYTHM AND VOLUME); MANAGEMENT TECHNIQUES FOR SUSPECTED PNEUMOTHORAX, HEMOTHORAX, FLAIL CHEST, TRAUMATIC ASPHYXIA, AND OTHER POTENTIAL THORACIC INJURIES.

9. PRACTICE - AIRWAY AND BREATHING ASSESSMENT, AND MANAGEMENT (4 HOURS)

DEMONSTRATE THE FOLLOWING SKILLS ON A SIMULATED PATIENT (OR MANIKIN): ASSESSING AIRWAY PATENCY, MAINTAINING A PATENT AIRWAY, ARTIFICIAL VENTILATION, VARIATIONS FOR CHILDREN AND LARYNGECTOMIES, OROPHARYNGEAL SUCTIONING; ADMINISTRATION OF OXYGEN; MAINTENANCE OF SUCTION; OXYGEN AND AIRWAY ADJUNCT EQUIPMENT; ASSESSMENT OF THE THORACIC WALL FOR AIR ENTRY, SYMMETRY, TENDERNESS, DEFORMITY AND COLOUR; IMMOBILIZATION OF THORACIC WALLS INSTABILITY; MANAGEMENT OF A PATIENT WITH A SUSPECTED PNEUMOTHORAX, HEMOTHORAX, TRAUMATIC ASPHYXIA, AIRWAY

OBSTRUCTION, UPPER AND TRACHEAL AIRWAY TRAUMA AND BURNS.

10. CARDIAC STATUS AND ARREST (2 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE HEART; SIGNS AND SYMPTOMS OF: IMPENDING CARDIAC ARREST; LIFE-THREATENING CARDIAC STATES; SIGNS AND SYMPTOMS OF CARDIAC ARREST; CARDIOPULMONARY RESUSCITATION BY ONE AND TWO RESCUERS; VARIATIONS FOR INFANTS AND CHILDREN.

11. PRACTICE - CARDIAC ARREST AND CARDIOPULMONARY RESUSCITATION (4 HOURS)

DEMONSTRATE THE FOLLOWING SKILLS ON A SUITABLE MANIKIN: ASSESSING PRESENCE OR ABSENCE OF PULSE; ASSESSING QUALITY AND QUANTITY OF PULSE; ONE AND TWO RESCUERS CARDIOPULMONARY RESUSCITATION; VARIATIONS OF CARDIOPULMONARY RESUSCITATION FOR CHILDREN AND INFANTS.

12. CIRCULATORY SYSTEM AND SHOCK (3 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE CIRCULATORY SYSTEM; SIGNS AND SYMPTOMS OF SHOCK; PREVENTING SHOCK; SIGNS AND SYMPTOMS OF EXTERNAL AND INTERNAL HEMORRHAGE; SIGNS AND SYMPTOMS OF CIRCULATORY DYSFUNCTION, INCLUDING CHANGES IN PULSE QUALITY AND QUANTITY AND CHANGES IN BLOOD PRESSURE.

13. PRACTICE - CIRCULATORY SYSTEM DISORDER AND SHOCK MANAGEMENT (5 HOURS)

DEMONSTRATE THE FOLLOWING SKILLS ON A SIMULATED PATIENT (OR MANIKIN): ASSESSMENT FOR CIRCULATORY INTEGRITY; RECOGNITION OF ONSET OF SHOCK; MANAGEMENT TECHNIQUES TO PREVENT OR LIMIT SHOCK; ASSESSMENT OF HEMORRHAGE; MANAGEMENT TECHNIQUES TO CONTROL OR

LIMIT THE EXTENT OF HEMORRHAGE; ONGOING EVALUATION OF PATIENT'S CIRCULATORY STATUS.

14. PRACTICE TEST AND EVALUATION (3 HOURS)

PATIENT ASSESSMENT, AIRWAY CARE, RESPIRATORY ARREST, CARDIAC ARREST, HEMORRHAGE AND SHOCK; TEST OF KNOWLEDGE AND SKILLS TAUGHT THUS FAR; PRACTICE ON AND EVALUATION OF SKILLS TAUGHT THUS FAR.

15. SOFT TISSUE INJURIES AND WOUND MANAGEMENT (3 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE SKIN AND SUB-EPITHELIAL STRUCTURES; SIGNS, SYMPTOMS AND SIGNIFICANCE OF VARIOUS WOUND TYPES, INCLUDING BUT NOT LIMITED TO LACERATIONS, PUNCTURES, AVULSIONS, AND BURNS; ASSESSMENT CRITERIA FOR DETERMINING DEGREE OF INJURY, INCLUDING DEPTH AND EXTENT OF BURNS; BASIC CARE OF WOUNDS; BASIC CARE FOR THE BURNED PATIENT; SPECIAL CONSIDERATIONS REQUIRED FOR DIFFERENT TYPES OF BURNS (HEAT, CHEMICAL, ELECTRICAL, RADIATION); DRESSING AND BANDAGING BURNS.

16. PRACTICE - SOFT TISSUE INJURY AND WOUND MANAGEMENT (2 HOURS)

DEMONSTRATE THE FOLLOWING SKILLS ON A SIMULATED PATIENT (OR MANIKIN): ASSESSING THE PATIENT TO DETERMINE THE EXTENT OF THE INJURY (OR BURN); APPLICATION OF THE MOST APPROPRIATE DRESSING AND/OR BANDAGING FOR THE SPECIFIC WOUND.

17. MUSCULO-SKELETAL SYSTEM INJURIES (2 HOURS)

STRUCTURES, PURPOSE AND FUNCTION OF THE MUSCULO-SKELETAL SYSTEM; DEFINE AND DESCRIBE THE DIFFERENT TYPES OF FRACTURES AND DISLOCATIONS; SIGNS AND SYMPTOMS OF FRACTURES, DISLOCATIONS, SPRAINS AND STRAINS; ASSESSMENT OF CRITERIA AND DETERMINING

NATURE AND EXTENT OF INJURY; PRINCIPLES OF
IMMOBILIZATION OF MUSCULO-SKELETAL INJURIES.

18. FRACTURES OF THE UPPER EXTREMITIES, THORAX AND
SHOULDER GIRDLE (2 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE
MUSCULO-SKELETAL ELEMENTS OF THE UPPER EXTREMITIES,
THORAX AND SHOULDER GIRDLE; ASSESSMENT CRITERIA,
SIGNS AND SYMPTOMS OF FRACTURES, DISLOCATION,
SPRAINS AND STRAINS; TECHNIQUES OF MANAGEMENT FOR
FRACTURES, DISLOCATIONS, SPRAINS AND STRAINS.

19. FRACTURES OF THE PELVIS AND LOWER EXTREMITIES
(2 HOURS)

STRUCTURE, PURPOSE AND FUNCTION OF THE MUSCULO-
SKELETAL ELEMENTS OF THE PELVIC GIRDLE AND LOWER
EXTREMITIES; ASSESSMENT CRITERIA, SIGNS AND SYMPTOMS
OF FRACTURES, DISLOCATIONS, SPRAINS AND STRAINS;
TECHNIQUES OF MANAGEMENT FOR FRACTURES, DISLOCA-
TIONS, SPRAINS AND STRAINS.

20. PRACTICE - MUSCULO-SKELETAL SYSTEM INJURY MANAGEMENT
(4 HOURS)

DEMONSTRATE THE FOLLOWING SKILLS ON A SIMULATED
PATIENT (OR MANIKIN): STATIC IMMOBILIZATION OF
PELVIC AND THORACIC FRACTURES; IMMOBILIZATION OF THE
SHOULDER GIRDLE; USE OF THE IMMOBILIZATION TECH-
NIQUES FOR EXTREMITIES INCLUDING, BUT NOT LIMITED
TO, PNEUMATIC, PADDED AND TRACTION SPLINTING
APPARATUS.

21. INJURIES TO THE EARS, EYES, NOSE AND OROPHARYNGEAL
PASSAGE (3 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE EARS,
EYES, NOSE AND OROPHARYNGEAL PASSAGE, INCLUDING THE

ATTENDANT UNDERLYING MUSCULO-SKELETAL STRUCTURES; ASSESSMENT CRITERIA FOR INJURY TO THE EARS, EYES, NOSE AND OROPHARYNGEAL PASSAGE, SIGNS AND SYMPTOMS OF INJURY TO THE EARS, EYES, NOSE, OROPHARYNGEAL PASSAGE AND THEIR ATTENDANT STRUCTURES; MANAGEMENT TECHNIQUES FOR INJURIES TO THE EARS, EYES, NOSE, OROPHARYNGEAL PASSAGE AND THEIR ATTENDANT STRUCTURES.

22. INJURIES TO THE CENTRAL NERVOUS SYSTEM (3 HOURS)
BASIC STRUCTURES, PURPOSE AND FUNCTION OF THE PARTS OF THE BRAIN, SPINAL CORD AND THE ATTENDANT MUSCULO-SKELETAL STRUCTURES; ASSESSMENT CRITERIA FOR INJURY TO THE BRAIN, SPINAL CORD AND THE ATTENDANT MUSCULO-SKELETAL STRUCTURES; SIGNS AND SYMPTOMS OF INJURY TO THE BRAIN, SPINAL CORD AND ATTENDANT MUSCULO-SKELETAL STRUCTURES. MANAGEMENT TECHNIQUES FOR INJURY TO THE BRAIN, SPINAL CORD AND/OR THE ATTENDANT MUSCULO-SKELETAL STRUCTURES.
23. PRACTICE - EARS, EYES, NOSE AND OROPHARYNGEAL PASSAGE INJURY MANAGEMENT (2 HOURS)
DEMONSTRATE ON A SIMULATED PATIENT (OR MANIKIN) THE FOLLOWING SKILLS: ASSESSMENT TECHNIQUES FOR INJURY TO THE EARS, EYES, NOSE, OROPHARYNGEAL PASSAGE AND THEIR ATTENDANT STRUCTURES; MANAGEMENT TECHNIQUES FOR INJURIES TO THE EARS, EYES, NOSE, OROPHARYNGEAL PASSAGE AND THE ATTENDANT MUSCULO-SKELETAL STRUCTURES; IMMOBILIZATION AND STABILIZATION OF FRACTURES OF THE BONY STRUCTURES OF THE FRONT OF THE SKULL; USE OF BANDAGING MATERIAL APPROPRIATE TO THE MANAGEMENT TECHNIQUES EMPLOYED.

24. PRACTICE - CENTRAL NERVOUS SYSTEM INJURY MANAGEMENT
(2 HOURS)

DEMONSTRATE ON A SIMULATED PATIENT (OR MANIKIN) THE FOLLOWING SKILLS: ASSESSMENT TECHNIQUES FOR INJURY TO THE BRAIN, SPINAL CORD AND THE ATTENDANT MUSCULO-SKELETAL STRUCTURES; STABILIZATION AND IMMOBILIZATION OF THE CERVICAL, THORACIC AND LUMBAR SPINE; STABILIZATION OF INJURIES TO THE SKULL; RECOGNITION AND CONTROL OF CONDITIONS THAT MAY BE REALIZED AS A RESULT OF INJURY TO THE CENTRAL NERVOUS SYSTEM AND/OR THE ATTENDANT STRUCTURES.

25. INJURIES TO THE ABDOMEN AND GENITO-URINARY SYSTEM
(2 HOURS)

BASIC STRUCTURE, PURPOSE AND FUNCTION OF THE INTERNAL ABDOMINAL STRUCTURES AND THE GENITO-URINARY STRUCTURES; ASSESSMENT CRITERIA FOR PENETRATING INJURIES TO THE ABDOMINAL AND GENITO-URINARY STRUCTURES; ASSESSMENT CRITERIA FOR BLUNT TRAUMA INJURIES TO THE ABDOMINAL AND GENITO-URINARY STRUCTURES; SIGNS AND SYMPTOMS OF PENETRATING OR BLUNT TRAUMA INJURIES; MANAGEMENT TECHNIQUES FOR PENETRATING OR BLUNT TRAUMA INJURY TO THE ABDOMINAL OR GENITO-URINARY STRUCTURES.

26. PRACTICE - MANAGEMENT OF THE ABDOMINAL AND GENITO-URINARY INJURIES (2 HOURS)

DEMONSTRATE ON A SIMULATED PATIENT (OR MANIKIN) THE FOLLOWING SKILLS: BASIC ASSESSMENT OF THE ABDOMEN; ASSESSMENT OF THE GENITO-URINARY SYSTEM; DRESSING AND BANDAGING OF OPEN WOUNDS TO THE ABDOMEN AND GENITALIA; MOVEMENT OF A PATIENT WITH SUSPECTED BLUNT TRAUMA INJURY TO THE ABDOMEN; MOVEMENT OF A PATIENT WITH A PENETRATING WOUND TO THE ABDOMEN AND GENITO-URINARY SYSTEM.

27. TRAUMA I, TEST AND EVALUATION (3 HOURS)

TEST OF KNOWLEDGE ON INJURIES TO VARIOUS AREAS OF THE BODY; PRACTICE ON AND EVALUATION OF SKILLS IN DRESSING, BANDAGING AND PERFORMING A COMPLETE PHYSICAL ASSESSMENT.

28. TRAUMA II, TEST AND EVALUATION (2 HOURS)

TEST OF KNOWLEDGE, PRACTICE ON AND EVALUATION OF SKILLS IN IMMOBILIZING FRACTURES OF THE UPPER AND LOWER EXTREMITIES.

29. MEDICAL CRISIS I (5 HOURS)

WILL INTRODUCE THE STUDENT TO CAUSATIVE FACTORS, ASSESSMENT CRITERIA, SIGNS, SYMPTOMS AND TECHNIQUES OF MANAGEMENT FOR: HEART ATTACK PATIENTS; CEREBRAL VASCULAR ACCIDENT PATIENTS; PATIENTS SUFFERING FROM DYSPNEA; HYPERGLYCEMIC AND HYPOGLYCEMIC REACTIONS; EPILEPTIC SEIZURES; PATIENTS SUFFERING FROM ACUTE ABDOMINAL PROBLEMS; UNDIAGNOSED UNCONSCIOUS STATES, INCLUDING, BUT NOT LIMITED TO, APPLICATION OF PATIENT ASSESSMENT SKILLS, CARDIOPULMONARY RESUSCITATION AND AIRWAY MAINTENANCE.

30. MEDICAL CRISIS II (2 HOURS)

CAUSATIVE FACTORS, ASSESSMENT CRITERIA, SIGNS, SYMPTOMS, AND TECHNIQUES OF MANAGEMENT FOR: VICTIMS OF POISONING, VICTIMS OF BITES AND STINGS; PATIENTS WITH COMMUNICABLE DISEASES; ALCOHOL AND DRUG ABUSE; PATIENTS IN EMOTIONAL CRISIS OR WITH POSSIBLE MENTAL HEALTH DISORDERS.

35. PRACTICE - ENVIRONMENTAL EMERGENCIES (1 HOUR)
DEMONSTRATE ON A SIMULATED PATIENT (OR MANIKIN) THE FOLLOWING SKILLS: ASSESSMENT CRITERIA FOR A PATIENT SUFFERING HEAT STROKE, HEAT EXHAUSTION, HEAT CRAMPS AND FROSTBITE; MANAGEMENT OF A PATIENT SUFFERING FROM HEAT STROKE, HEAT EXHAUSTION, HEAT CRAMPS AND FROSTBITE.
36. BIOMECHANICS (LIFTING AND MOVING TECHNIQUES) (2 HOURS)
TECHNIQUES OF SAFELY LIFTING AND MOVING PATIENTS ON A MULTILEVEL STRETCHER, RESCUE STRETCHER, STOKES STRETCHER, LONG SPINE BOARD, SCOOP STRETCHER AND OTHER SIMILAR APPARATI COMMON TO THE GRADUATE'S ROLE.
37. PATIENT EXTRICATION (4 HOURS)
BASIC THEORY AND PRACTICAL SKILLS INVOLVED IN GAINING ACCESS TO PACKAGING AND EXTRICATION OF PERSONS FROM AUTOMOBILES; PACKAGING AND REMOVING PATIENTS WITH SUSPECTED SPINE AND OTHER INJURIES FROM AUTOMOBILES OR OTHER CONFINEMENTS; REMOVING PATIENTS FROM BENEATH OBSTACLES (E.G. AUTOMOBILES).
38. MEDICAL EMERGENCIES, EMERGENCY CHILDBIRTH, ENVIRONMENTAL EMERGENCIES, LIFTING AND MOVING - PRACTICAL TEST AND EVALUATION (2 HOURS)
TEST OF KNOWLEDGE OF MEDICAL EMERGENCIES, EMERGENCY CHILDBIRTH, ENVIRONMENTAL EMERGENCIES, AND LIFTING AND MOVING PATIENTS, TEST OF PRACTICAL SKILLS REQUIRED TO MANAGE MEDICAL EMERGENCIES, EMERGENCY CHILDBIRTH, LIFTING AND MOVING PATIENTS, AND ENVIRONMENTAL EMERGENCIES.

39. VEHICLE MAINTENANCE AND OPERATION (2 HOURS)

PRINCIPLES AND PROCEDURES FOR A PREVENTATIVE MAINTENANCE PROGRAM; PRINCIPLES AND PROCEDURES FOR VEHICLE CLEANLINESS; PRINCIPLES AND PROCEDURES OF SAFE VEHICLE OPERATION, IN KEEPING WITH THE BEST INTERESTS OF THE PATIENTS AND THE PUBLIC AT LARGE; IMPLICATIONS OF DRIVER ACTIONS ON THE WELFARE OF THE PATIENT.

40. PRACTICE - VEHICLE MAINTENANCE AND OPERATION (4 HOURS)

DEMONSTRATE THE PROCEDURES TO BE EMPLOYED: WHEN CONDUCTING A PREVENTATIVE MAINTENANCE CHECK; TO ENSURE APPROPRIATE CLEANLINESS OF THE VEHICLE; FOR THE SAFE OPERATION OF AN AMBULANCE IN A CONTROLLED AND PUBLIC ENVIRONMENT.

41. INTRODUCTION TO HOSPITAL PROCEDURES (AS REQUIRED FOR ORIENTATION; MUST NOT BE LESS THAN 24 HOURS)

OBSERVE AND ASSIST WITH BASIC PATIENT CARE PROCEDURES UNDER CLINICAL SUPERVISION IN A HOSPITAL EMERGENCY RECEIVING DEPARTMENT AND/OR OTHER APPROPRIATE CRITICAL CARE CLINICAL FACILITY; EVALUATE THE EFFECT OF ANY KNOWN PRE-HOSPITAL CARE ON THE EMERGENCY/IN-HOSPITAL CARE RENDERED TO THE PATIENT; OBSERVE THE IMPORTANCE OF ACCURATE AND COMPLETE PATIENT IDENTITY AND ASSESSMENT INFORMATION; RECOGNIZE AND DEMONSTRATE THE IMPORTANCE OF ACCURATE REPORTING AND DOCUMENTATION IN THE EMERGENCY RECEIVING DEPARTMENT.

42. PRE-HOSPITAL CLINICAL EXPERIENCE (AMBULANCE)
(25 DOCUMENTED CALLS REQUIRED TOTALLING 25 HOURS)

DEMONSTRATE, DOCUMENT AND REPORT ON A VARIETY OF PRE-HOSPITAL PATIENT MANAGEMENT EXPERIENCES,

INCLUDING AN APPROPRIATE BALANCE OF EMERGENT AND
NON-EMERGENT PATIENT MANAGEMENT EXPERIENCE.

43. FINAL PROFICIENCY TEST (4 HOURS, I.E. 2 HOURS OF
THEORY AND 2 HOURS OF PRACTICAL SKILLS)
TEST OF KNOWLEDGE AND SKILLS LEARNED IN THE
EMERGENCY CARE COURSE.

I) THEORY TEST

- II) PRACTICAL SITUATION TEST USING A SIMULATION
REFLECTING REAL CIRCUMSTANCES AS CLOSELY AS
POSSIBLE.

THEORY (MINIMUM SUGGESTED)	117
IN-HOSPITAL (MINIMUM REQUIRED)	24
ON-CAR (MINIMUM REQUIRED)	<u>25</u>
TOTAL MINIMUM NUMBER OF HOURS SUGGESTED AND REQUIRED FOR LEVEL I TRAINING:	<u>166</u>

CHAPTER 2

MINIMUM COMPETENCY REQUIREMENTS

LEVEL II EMERGENCY MEDICAL ATTENDANT PROGRAMS

PREPARED FOR THE

CONJOINT COMMITTEE ON ACCREDITATION

OF EDUCATIONAL PROGRAMS FOR

EMERGENCY MEDICAL ATTENDANTS

DECEMBER 1981

INTRODUCTION

NEED FOR LEVEL II EMA

MANY AREAS OF THE COUNTRY ARE UNABLE TO OFFER LEVEL III (ADVANCED LIFE SUPPORT) TRAINING PROGRAMS BUT FACE IMMEDIATE NEEDS WHICH MAY BE MET BY LEVEL I GRADUATES WITH ADDITIONAL DEPTH OF SKILL AND TRAINING IN SELECTED ADVANCED LIFE SUPPORT SKILLS. THE LEVEL II TRAINING PROGRAM IS AN INTERMEDIATE BETWEEN THE BASIC AND ADVANCED LIFE SUPPORT PROGRAMS; IT MAY SERVE AS AN END IN ITSELF OR AS A STEP TOWARDS LEVEL III TRAINING.

ADDITIONAL DEPTH AND NEW RESPONSIBILITIES

CANDIDATES ENTERING LEVEL II PROGRAMS SHALL ACQUIRE ADDITIONAL DEPTH IN MANY LEVEL I SKILLS, AND WILL ALSO ACQUIRE A SET OF NEW SKILLS INCLUDING, (BUT NOT LIMITED TO):

- (1) HISTORY-TAKING AND SYSTEMS ASSESSMENT
- (2) CHEST AUSCULTATION
- (3) INITIAL MANAGEMENT OF SHOCK BY
 - (A) INTRAVENOUS THERAPY
 - (B) USE OF PNEUMATIC ANTISHOCK GARMENTS
- (4) AIRWAY MANAGEMENT
- (5) ANALGESIA ADMINISTRATION
- (6) INTERMEDIATE EXTRICATION

REQUIREMENTS FOR ACCREDITATION

LEVEL II PROGRAMS SEEKING ACCREDITATION MUST SPECIFY AS A PREREQUISITE FOR ADMISSION TO THE LEVEL II PROGRAM THE COMPLETION OF A LEVEL I ACCREDITED PROGRAM OR EQUIVALENT.

PROGRAMS SEEKING ACCREDITATION MUST INCLUDE TRAINING OBJECTIVES SPECIFIED AND BE ABLE TO DEMONSTRATE THAT THEY INCLUDE ALL ACADEMIC AND CLINICAL PERFORMANCE COMPONENTS NECESSARY TO PRODUCE COMPETENT QUALIFIED PRACTITIONERS.

OTHER DETAILED REQUIREMENTS RELATED TO PROGRAM ADMINISTRATION, POLICY AND FACILITIES ARE LISTED IN THE BASIS OF ACCREDITATION.

A MODULAR APPROACH

THE MODULES PRESENTED HERE IDENTIFY REQUIRED SKILLS AND KNOWLEDGE COMPONENTS IN CONVENIENT UNITS. APPROXIMATE TEACHING TIMES ARE INCLUDED IN EACH MODULE FOR GUIDANCE AS TO THE COMPLEXITY OR DEPTH OF TEACHING. THEY ARE SUGGESTED HOURS ONLY, AND NEED NOT BE RIGIDLY FOLLOWED. THE ACCREDITATION PROCESS WILL FOCUS ON WHETHER OR NOT REQUIRED COURSE OBJECTIVES ARE INCLUDED AND WHETHER ARRANGEMENTS ARE SUCH THAT THEY MAY BE SUCCESSFULLY ACHIEVED, RATHER THAN ON MECHANICAL COMPLIANCE WITH ALLOTTED HOURS.

THE ASSESSMENT OF KNOWLEDGE AND SKILLS MUST BE BASED ON BOTH ACADEMIC AND CLINICAL PERFORMANCE, THE LATTER IN BOTH SIMULATED AND REAL SITUATIONS WHENEVER POSSIBLE.

CURRICULUM AND PERFORMANCE OBJECTIVES
COMPRISING LEVEL II COMPETENCY REQUIREMENTS

(A) DIDACTIC

1. HISTORY-TAKING

SUGGESTED TIME	4 HOURS CLASSROOM 2 HOURS PRACTICE
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GENERAL GOAL	TO TAKE, RECORD AND COMMUNICATE A HISTORY IN THE PROPER MEDICAL FORMAT.
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SPECIFIC OBJECTIVES	<ul style="list-style-type: none">- LEARN AND APPLY THE MEDICAL FORMAT; (CHIEF COMPLAINT, HISTORY OF PRESENT ILLNESS, PAST HISTORY, FUNCTIONAL ENQUIRY.)- LEARN AND APPLY QUESTIONS FOR SYMPTOM'S EXPANSIONS (WHEN STARTED, WHERE, BETTER/WORSE, RADIATION)- LEARN MAJOR QUESTIONS AND ANSWERS IMPORTANT IN THE FOUR FOLLOWING MAJOR CLINICAL SITUATIONS: CHEST PAIN, SHORTNESS OF BREATH, TRAUMATIC INJURY, SUDDEN ACUTE ABDOMINAL PAIN- DEMONSTRATE (IN SIMULATED PRACTICE) EFFECTIVE HISTORY- TAKING.
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2. COMMUNICATION SKILLS

NOTE: IT IS RECOMMENDED THAT THIS SECTION BE TAUGHT BY AN EMERGENCY PHYSICIAN OR BY A PHYSICIAN FREQUENTLY INVOLVED IN RECEIVING PATIENTS IN AN EMERGENCY SETTING.

SUGGESTED 2 HOURS
TIME

GENERAL TO COMMUNICATE ACCURATELY, BOTH
GOAL ORALLY AND IN WRITING, FACTS
 RELEVANT TO HISTORY, ASSESSMENT
 AND PRE-HOSPITAL MANAGEMENT OF A
 PATIENT.

SPECIFIC - IDENTIFY RELEVANT HISTORICAL
OBJECTIVES DATA
 - IDENTIFY RELEVANT PHYSICAL
 FINDINGS
 - UNDERSTAND MEDICO-LEGAL
 IMPLICATIONS OF DOCUMENTATION
 - USE RADIO/TELEPHONE
 APPROPRIATELY TO COMMUNICATE
 RELEVANT MEDICAL INFORMATION
 - PREPARE AND PRESENT, IN AN
 ORDERLY FASHION, MEDICAL
 INFORMATION INCLUDING THAT
 RELEVANT TO PRE-HOSPITAL
 INTERVENTION, TO A PHYSICIAN,
 SO AS TO PROPERLY ASSIST
 MEDICAL MANAGEMENT.

3. CARDIOVASCULAR ASSESSMENT

SUGGESTED 8 HOURS
TIME

GENERAL TO UNDERSTAND CARDIOVASCULAR
GOAL DYNAMICS AND RECOGNIZE ACUTE
 MYOCARDIAL INFARCTION AND ITS
 MAJOR COMPLICATIONS (SHOCK, PUL-
 MONARY EDEMA, CARDIAC ARREST).

SPECIFIC LEARN NECESSARY BACKGROUND BY THE
OBJECTIVES STUDY OF:

- ANATOMY (REVIEW)
- CONTROL MECHANISMS OF CARDIAC
OUTPUT
- STARLING'S LAW
- MEANING OF SYSTOLIC/DIASTOLIC
BLOOD PRESSURE
- FACTORS AFFECTING VENOUS
RETURN (INCLUDING POSTURAL
EFFECTS, VASOVAGAL EFFECTS)
- RIGHT AND LEFT HEART FAILURE
I.E. MECHANISM, SIGNS AND
SYMPTOMS
- CHEST PAIN IN CARDIAC DISEASE
- CARDIAC SHOCK - MECHANISM,
SIGNS AND SYMPTOMS
- MECHANISM AND INCIDENCE OF
SUDDEN DEATH
- CLINICAL ESTIMATES OF CARDIAC
OUTPUT AND PERFUSION
- PRINCIPLES OF MANAGEMENT OF
ACUTE MYOCARDIAL INFARCTION

4. SHOCK

SUGGESTED
TIME

8 HOURS

GENERAL
GOALS

TO UNDERSTAND THE MECHANISMS OF
SHOCK, INCLUDING COMPENSATORY
MECHANISMS.

TO BE ABLE TO RECOGNIZE ALL
STAGES OF SHOCK.

TO UNDERSTAND THE PLACE AND
IMPORTANCE OF APPROPRIATE SHOCK
MANAGEMENT IN THE FIELD.

SPECIFIC
OBJECTIVES

LEARN NECESSARY BACKGROUND BY
STUDY OF:

- MEANING OF "TISSUE
PERFUSION"
- EFFECTS OF CELLULAR HYPOXIA
- MECHANISM OF CELL DEATH
- TYPES OF SHOCK (STRESSING
COMMON ELEMENTS): HYPOVO-
LEMIC, VAGAL, CARDIAC,
ANAPHYLACTIC, SPINAL
- COMPENSATORY MECHANISMS
- FOUR STAGES OF SHOCK
(AMERICAN COLLEGE OF
SURGEONS' CLASSIFICATION)
- RECOGNITION OF EARLY SHOCK
- SPECIAL CONSIDERATIONS APPLY-
ING TO INFANTS AND ELDERLY
PATIENTS.

5. FLUIDS AND ELECTROLYTES

SUGGESTED 2 HOURS
TIME

GENERAL TO UNDERSTAND THE BASIC ELEMENTS
GOALS INVOLVED IN FLUID AND ELECTROLYTE
 DYNAMICS.

SPECIFIC DEMONSTRATE THE ABILITY TO DEFINE
OBJECTIVES THE FOLLOWING TERMS:

- INTRA/EXTRACELLULAR FLUID
- INTRA/EXTRAVASCULAR FLUID
- ION, CATION, ANION, ISOTONIC,
HYPOTONIC, HYPERTONIC
SOLUTIONS
- CRYSTALLOID, COLLOID
SOLUTIONS
- OSMOSIS, DIFFUSION

DEMONSTRATE THE ABILITY TO
IDENTIFY THE CHIEF IONS IN
INTRACELLULAR AND EXTRACELLULAR
FLUID AND THEIR RELATIVE
PROPORTIONS.

6. INTRAVENOUS THERAPY

SUGGESTED 4 HOURS
TIME

GENERAL TO UNDERSTAND AND APPLY THE
GOALS TECHNIQUES FOR STARTING AN IV.

TO BE ABLE TO CHOOSE AN
APPROPRIATE IV SOLUTION.

SPECIFIC
OBJECTIVES

LEARN NECESSARY BACKGROUND BY
STUDY OF:

- THE ANATOMY OF SUPERFICIAL
VEINS OF THE HAND AND
FOREARM
- BECOME FAMILIAR WITH THE
EQUIPMENT
- IDENTIFY APPROPRIATE
PERIPHERAL IV SITES
- PERFORM VENOUS CANNULATION
USING MEDICALLY-ACCEPTED
TECHNIQUES
- CALCULATE IV FLOW RATE
- OBTAIN VENOUS BLOOD SPECIMEN
- IDENTIFY AND DIFFERENTIATE
THE FOLLOWING IV SOLUTIONS:
NORMAL SALINE, RINGER'S
LACTATE, 5% D/W 2/3-1/3
SOLUTION
- DESCRIBE THE SPECIAL
CONSIDERATIONS FOR
ADMINISTRATION OF BLOOD
- DESCRIBE THE ROLE OF IV
THERAPY IN PRE-HOSPITAL
MANAGEMENT.

7. SOFT TISSUE INJURIES

SUGGESTED
TIME

4 HOURS

GENERAL GOAL	TO UNDERSTAND THE MECHANISMS AND COMPLICATIONS OF BURNS, CRUSH INJURIES AND AMPUTATIONS.
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SPECIFIC OBJECTIVES	(1) BURNS: <ul style="list-style-type: none">- ESTIMATE DEPTH, AREA AND FLUID REPLACEMENT- PROVIDE TOPICAL CARE- PROVIDE CARE FOR SPECIAL SITES (FACE, AIRWAY, INHALATIONAL INJURY) (2) CRUSH INJURIES: <ul style="list-style-type: none">- ESTIMATE TISSUE DAMAGE- ESTIMATE BLOOD LOSS (3) RECOGNIZE VASCULAR COMPROMISE: <ul style="list-style-type: none">- IN THE SKIN- IN THE EXTREMITIES (4) PROVIDE CARE FOR AMPUTATED PARTS
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8. RESPIRATORY SYSTEM

SUGGESTED TIME	8 HOURS
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GENERAL GOALS	TO UNDERSTAND RESPIRATORY PHYSIOLOGY, INCLUDING CONTROL MECHANISMS AND PERFORM A CHEST ASSESSMENT BY INSPECTION, PALPA- TION AND AUSCULTATION.
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SPECIFIC OBJECTIVES	LEARN NECESSARY BACKGROUND BY STUDY OF:
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- ANATOMY AND PHYSIOLOGY OF AIRWAYS AND LUNG FIELDS (REVIEW)
- ALVEOLAR ANATOMY AND RESPIRATORY FUNCTION ON THE CELLULAR LEVEL (REVIEW)
- ACCESSORY MUSCLES FOR RESPIRATION
- RESPIRATORY CONTROL CENTRES
- AIRWAY RESISTANCE - MECHANISMS AND EFFECTS
- MEDICAL CAUSES OF ACUTE RESPIRATORY FAILURE (PNEUMONIA, PULMONARY EDEMA, ASTHMA)

DEMONSTRATE ACHIEVEMENT OF GOALS BY:

- EXAMINATION OF THE CHEST: SUPERFICIAL ANATOMY, INSPECTION, RESPIRATORY EXCURSION
- AUSCULTATION TO DETERMINE: SYMMETRY OF AIRFLOW, ADEQUACY OF VENTILATION, PRESENCE OF AIRWAY OBSTRUCTION (INCLUDING BRONCHOSPASM)
- RECOGNITION OF RESPIRATORY FAILURE - HYPOXIA CYANOSIS, VENTILATORY FAILURE
- DESCRIPTION OF THE PROPER ROLE OF OXYGEN IN MANAGEMENT OF ACUTE RESPIRATORY FAILURE.

9. THORACIC TRAUMA

SUGGESTED 8 HOURS
TIME

GENERAL TO UNDERSTAND THE MECHANICS OF
GOALS CHEST WALL INJURIES.

TO LEARN TO EXAMINE FOR AND
RECOGNIZE MAJOR CHEST INJURIES.

TO RECOGNIZE HYPOXIA AND THE
EFFECTS OF OXYGEN THERAPY.

TO UNDERSTAND THE COMBINED
EFFECTS OF CHEST INJURIES AND
COMA.

LEARN NECESSARY BACKGROUND BY
STUDY OF:

- TRAUMATIC DISRUPTION OF CHEST
WALL (RIB FRACTURES, FLAIL
CHEST, OPEN CHEST WOUNDS)
- INTERNAL THORACIC INJURIES
(LUNG CONTUSION, HEMOTHORAX,
PNEUMOTHORAX)
- CLINICAL EFFECTS AND TREAT-
MENT OF HYPOXIA
- CLINICAL EFFECTS AND TREAT-
MENT OF ACUTE VENTILATORY
FAILURE

- DESCRIBE THE EXAMINATION OF
THE INJURED CHEST - SYMMETRY,
AIR ENTRY, ASPIRATION

- DIFFERENTIATE BETWEEN UPPER AND LOWER AIRWAY OBSTRUCTION
- SPECIFY SPECIAL CONSIDERATIONS IN COMA (RESPIRATORY DRIVE, AIRWAY/C-SPINE CONSIDERATIONS).

10. AIRWAY MANAGEMENT

SUGGESTED 8 HOURS DIDACTIC
TIME 4 HOURS PRACTICAL

GENERAL TO UNDERSTAND, IN DEPTH, UPPER
GOALS AIRWAY ANATOMY AND DISORDERS
LEADING TO AIRWAY OBSTRUCTION.

TO HANDLE THE EMBARRASSED AIRWAY,
CONFIDENTLY AND EFFECTIVELY, WITH
ALL TECHNIQUES UP TO, BUT NOT
NECESSARILY INCLUDING CANNU-
LATION.

SPECIFIC LEARN NECESSARY BACKGROUND BY
OBJECTIVES STUDY OF:

- ANATOMY OF THE UPPER AIRWAY
(IN DETAIL)
- AIRWAY MANIPULATION AND ITS
RELATIONSHIP TO POSSIBLE
C-SPINAL INJURIES
- RECOGNIZE ACUTE UPPER AIRWAY
OBSTRUCTION
- PERFORM DEEP SUCTIONING TECH-
NIQUES

- PERFORM OBSTRUCTED AIRWAY MANOEUVRES
- PERFORM MANUAL MANIPULATION OF EMBARRASSED AIRWAY
- PERFORM VENTILATION WITH ADJUNCTIVE DEVICES:
 - A. MANUALLY TRIGGERED PRESSURE DEVICES
 - B. BAG-VALVE AND MASK
- REMOVE FOREIGN BODIES WITH LARYNGOSCOPE AND MCGILL FORCEPS
- LEARN AND APPLY CARDIO-PULMONARY TECHNIQUES OF AIRWAY MANAGEMENT.

11. SPINAL INJURIES

SUGGESTED 4 HOURS
TIME

GENERAL TO UNDERSTAND THE MECHANICS
GOALS INVOLVED IN SPINAL INJURY.

TO PERFORM A RELIABLE
EXAMINATION FOR SPINAL CORD
INJURY.

TO USE TRACTION TO STABILIZE
CERVICAL INJURIES.

TO USE IMMOBILIZATION TECHNIQUES
NECESSARY FOR COMPLEX EXTRICATION
AND TRANSPORT.

SPECIFIC
OBJECTIVES

LEARN NECESSARY BACKGROUND BY
STUDY OF:

- ANATOMY OF VERTEBRAE AND THEIR RELATIONSHIP TO THE SPINAL CORD (REVIEW)
- DIFFERENCES IN CERVICAL, THORACIC AND LUMBAR STRUCTURES
- CLASSIC PATTERNS OF SPINAL INJURY:
 - A. HIGH CERVICAL
 - B. LOW CERVICAL
 - C. THORACIC AND LUMBAR
- MECHANISMS CAUSING SPINAL DISRUPTION - AND WHEN TO SUSPECT SPINAL CORD INJURY
- EXAMINE FOR SPINAL CORD DEFICIT
- APPLY TRACTION TECHNIQUES FOR CERVICAL STABILIZATION
- APPLY ADVANCED IMMOBILIZATION TECHNIQUES NECESSARY FOR COMPLEX EXTRICATION OR TRANSPORT.

12. CENTRAL NERVOUS SYSTEM ASSESSMENT

SUGGESTED
TIME

4 HOURS

GENERAL
GOALS

TO MAKE A RELEVANT FIELD
ASSESSMENT OF NEUROLOGICAL
STATUS.

TO ANTICIPATE AND INTERPRET
CHANGING NEUROLOGICAL SIGNS
FOLLOWING A HEAD INJURY.

SPECIFIC
OBJECTIVES

LEARN THE NECESSARY BACKGROUND BY
STUDY OF:

- CLASSICAL PROGRESSION OF
SIGNS WITH RISING INTRA-
CRANIAL PRESSURE
- PERFORM AN ACUTE NEUROLOGICAL
ASSESSMENT - LEVEL OF CON-
SCIOUSNESS USING GLASGOW COMA
SCALE, MENTAL STATUS, AMNE-
SIA, SENSORY/MOTOR/SPEECH
DISTURBANCES, PUPILLARY
SIGNS
- RECOGNIZE MAJOR NON-TRAUMATIC
NEUROLOGICAL SYNDROMES
(SEIZURES, CARDIOVASCULAR
ACCIDENT, SUBARACHNOID
HEMORRHAGE)
- ASSESS INJURIES TO THE HEAD -
OPEN/CLOSED

13. HYPOGLYCEMIA

SUGGESTED
TIME

2 HOURS

GENERAL
GOALS

TO RECOGNIZE VARIOUS CLINICAL
STAGES OF HYPOGLYCEMIA.

TO MANAGE ALL STAGES OF HYPOGLY-
CEMIA.

SPECIFIC OBJECTIVES	LEARN THE NECESSARY BACKGROUND KNOWLEDGE BY STUDY OF: <ul style="list-style-type: none">- THE PHYSIOLOGICAL CONTROLS OF BLOOD GLUCOSE- THE EFFECTS OF LOW BLOOD SUGAR<ul style="list-style-type: none">(A) ON CELLULAR LEVEL(B) CLINICAL EFFECTS- PREVENTIVE MEASURES (IN A DIABETIC)- DEFINITIVE MANAGEMENT- ANTICIPATE WHEN HYPOGLYCEMIA USUALLY OCCURS
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14. ABDOMINAL DISORDERS

SUGGESTED TIME	4 HOURS
GENERAL GOALS	<p>TO UNDERSTAND THE PHYSICAL SIGNS IN ALL ABDOMINAL INJURIES.</p> <p>TO RECOGNIZE MAJOR NON-TRAUMATIC ABDOMINAL CATASTROPHES.</p>
SPECIFIC OBJECTIVES	LEARN THE NECESSARY BACKGROUND BY STUDY OF: <ul style="list-style-type: none">- LIMITATIONS OF PHYSICAL ASSESSMENT IN THIS DISORDER- MECHANISM IN BLUNT ABDOMINAL TRAUMA- PERFORM PHYSICAL ASSESSMENT IN BLUNT ABDOMINAL TRAUMA

- LOCALIZE TENDERNESS
- IDENTIFY RIGIDITY
- RECOGNIZE THE CLASSICAL PRESENTATIONS OF:
 - RUPTURED ABDOMINAL ANEURISM
 - RUPTURED ECTOPIC PREGNANCY

15. EMERGENCY OBSTETRICS

SUGGESTED 4 HOURS
TIME

GENERAL TO LEARN A BASIC APPROACH TO
GOAL EMERGENCY CHILDBIRTH AND NEONATAL
 CARE.

SPECIFIC LEARN THE NECESSARY BACKGROUND BY
OBJECTIVES STUDY OF:

- STAGES OF LABOUR
- RELEVANT HISTORY-TAKING FOR CHILDBIRTH
- ASEPTIC TECHNIQUES FOR EMERGENCY DELIVERY
- CONTROL OF THE HEAD DURING PRECIPITATED DELIVERY
- ECLAMPSIA
- SIGNS OF MATERNAL/FETAL DISTRESS
- BASIC NEWBORN RESUSCITATION (INCLUDING SUCTIONING AND TEMPERATURE CONTROL, USE OF

- LIMITATIONS OF OUT-OF-
HOSPITAL DELIVERY

16. ANALGESIA ADMINISTRATION

SUGGESTED 4 HOURS
TIME

GENERAL TO UNDERSTAND AND DEMONSTRATE THE
GOALS USE OF 50% OXYGEN-NITROUS OXIDE
 (N₂O) MIXTURE FOR THE CONTROL
 OF PAIN.

SPECIFIC APPLY THE FOLLOWING KNOWLEDGE
OBJECTIVES BASE TO THE USE OF N₂O/O₂:

- THE ADVANTAGES OF N₂O FOR
FIELD USE
- INDICATIONS/
CONTRAINDICATIONS
- POTENTIAL COMPLICATIONS
- USE AND MAINTAIN THE
EQUIPMENT

17. PNEUMATIC ANTISHOCK GARMENT* (PASG)

SUGGESTED 4 HOURS
TIME

GENERAL TO USE THE PNEUMATIC ANTISHOCK
GOALS GARMENT (PASG) IN SHOCK.

TO UNDERSTAND ITS POTENTIAL IN
OTHER CLINICAL SITUATIONS.

SPECIFIC OBJECTIVES	- IDENTIFY THE ADVANTAGES OF PASG FOR FIELD USE
	- IDENTIFY THE PHYSIOLOGICAL EFFECTS OF PASG
	- IDENTIFY INDICATIONS/ CONTRAINDICATIONS
	- IDENTIFY POTENTIAL COMPLICATIONS
	- USE THE EQUIPMENT
	- EMPLOY EFFECTIVE MAINTENANCE AND STORAGE.

*NOTE: THE USE OF THE PASG IS NOT RECOMMENDED IN AREAS
WHERE HOSPITAL RECEIVING PERSONNEL ARE NOT FULLY
ORIENTED TO ITS PROPER USE.

18. INTERMEDIATE EXTRICATION

SUGGESTED TIME	4 HOURS DIDACTIC
	4 HOURS PRACTICAL
GENERAL GOAL	TO EFFECT SAFE EXTRICATION FROM COMPLEX SITUATIONS USING EXTRICATION EQUIPMENT.
SPECIFIC OBJECTIVES	- IDENTIFY THE PRINCIPLES OF GAINING ACCESS TO A CONFINED AREA
	- BECOME FAMILIAR WITH BASIC TOOLS FOR AUTOMOTIVE CRASH RESCUE, INCLUDING (BUT NOT

- LIMITED TO): HACKSAW, 4 FT. BARS, SHORING, CRIBBING, JACKS, COME-ALONGS, CHISELS, HAMMERS, CENTREPUNCHES AND SPECIFIC MANUAL ENTRY TOOLS
- IDENTIFY PRINCIPLES OF FIRE PREVENTION AND SUPPRESSION IN THE CRASH RESCUE SETTING
 - USE THE ABC FIRE EXTINGUISHER
 - PREVENT ADDITIONAL POST-IMPACT HAZARDS TO THE PATIENT
 - IDENTIFY CRASH RESCUE/EXTRICATION FEATURES OF SPECIFIC PATIENT ENTRAPMENTS
 - IDENTIFY PRIMARY MANAGEMENT IN SPECIFIC ENTRAPMENTS
 - IDENTIFY THE ROLE OF THE LEVEL II GRADUATE IN RELATIONSHIP TO THE PROVIDERS OF INTERMEDIATE AND HEAVY RESCUE.

19. HYPOTHERMIA

SUGGESTED
TIME

2 HOURS

GENERAL
GOAL

TO UNDERSTAND THE RISK OF
HYPOTHERMIA AND THE APPROACH TO
ITS MANAGEMENT.

SPECIFIC
OBJECTIVES

LEARN THE NECESSARY BACKGROUND BY
STUDY OF:

- THE PATHOPHYSIOLOGY OF COLD INJURY
 - | CLINICAL EFFECTS |
 - | CELLULAR EFFECTS |
- AT VARIOUS TEMPERATURES
- THE SIGNS OF COLD INJURY TO EXTREMITIES
- IDENTIFY PASSIVE RE-WARMING TECHNIQUES
- IDENTIFY POSSIBLE METHODS OF MODIFICATION TO CPR IN CASES OF CARDIAC ARREST ASSOCIATED WITH HYPOTHERMIA.

20. CRISIS INTERVENTION

SUGGESTED 4 HOURS
TIME

GENERAL TO BECOME FAMILIAR WITH THE
GOALS PRINCIPLES OF CRISIS MANAGEMENT.

TO IDENTIFY AN APPROACH TO COPING
WITH PATIENTS AND FAMILY IN
EMOTIONAL CRISIS.

SPECIFIC - DIFFERENTIATE BETWEEN AN
OBJECTIVES EMOTIONAL CRISIS AND A
MEDICAL CRISIS

- UNDERSTAND THE LEGAL
IMPLICATIONS OF ACTING OR
FAILING TO ACT IN SUPPORT OF

AN EMOTIONALLY DISTURBED
PATIENT

- IDENTIFY THE VERBAL TECHNIQUES FOR DEALING WITH EMOTIONAL DISTURBANCE AND AGGRESSION
- UNDERSTAND THE LEGAL RAMIFICATIONS OF PATIENT RESTRAINT
- IDENTIFY COMMON PATTERNS OF DRUG ABUSE
- DEVELOP AN APPRECIATION OF SOME OF THE MEDICAL DISORDERS THAT MAY MASQUERADE AS "EMOTIONAL DISTURBANCE".

21. STRESS MANAGEMENT

SUGGESTED 4 HOURS
TIME

GENERAL TO RECOGNIZE OCCUPATIONAL STRESS
GOALS IN THE HEALTH CARE WORKER.

TO GIVE THE STUDENT AN ORIENTA-
TION TO STRESS MANAGEMENT.

SPECIFIC LEARN NECESSARY BACKGROUND BY
OBJECTIVES STUDY OF:

- THE PHYSIOLOGICAL SIGNS OF STRESS
- COMMON COPING MECHANISMS
- THE ROLE OF DENIAL

- THE IMPORTANCE OF THE PEER GROUP AND THE FAMILY
- HIGH RISK OCCUPATIONS FOR STRESS
- LEARN TO RECOGNIZE OCCUPATIONAL STRESS
- CONTRIBUTE CONSTRUCTIVE SUGGESTIONS FOR COPING WITH STRESS

22. DISASTER MANAGEMENT

SUGGESTED 4 HOURS
TIME

GENERAL TO UNDERSTAND THE COMPLEXITIES
GOALS INVOLVED IN DISASTER MANAGEMENT.

SPECIFIC LEARN NECESSARY BACKGROUND BY
OBJECTIVES STUDY OF:

- THE PRINCIPLES OF EMERGENCY PREPAREDNESS
- THE PRINCIPLES OF MASS CASUALTY SORTING AND CLEARING
- THE FEATURES OF A CONTINGENCY PLAN
- DOCUMENTATION TOOLS FOR MASS CASUALTIES
- THE IMPORTANCE OF MULTI-AGENCY COOPERATION, INCLUDING MAJOR PARTICIPANTS INVOLVED IN LARGE SCALE DISASTER MANAGEMENT

- DEVELOP DISASTER
COMMUNICATION SKILLS
- IDENTIFY THE ROLE OF THE
LEVEL II GRADUATE WITH
RESPECT TO OTHER WORKERS IN
THE IMPLEMENTATION OF A
CONTINGENCY PLAN

23. MULTIPLE SYSTEMS ASSESSMENT

SUGGESTED 4 HOURS
TIME

GENERAL TO TRANSLATE ASSESSMENT SKILLS
GOALS LEARNED IN OTHER MODULES TO SITU-
 ATIONS INVOLVING MULTIPLE SYSTEM
 INJURY.

TO ORGANIZE CARE AND SET
TREATMENT PRIORITIES.

SPECIFIC PERFORM VITAL FUNCTIONS
OBJECTIVES ASSESSMENT (FOLLOW ADVANCED
 TRAUMA LIFE SUPPORT GUIDELINES)

- AIRWAY
- BREATHING
- CIRCULATION
- NEUROLOGICAL (ASSESSMENT OF
NEUROLOGICAL DISABILITY)
- PRIMARY SURVEY
- RESUSCITATION PHASE
- SECONDARY SURVEY (HEAD TO
TOE)
- COMMUNICATION
- TRANSPORT TO DEFINITE CARE

PRACTICE (USING CASE STUDY AND SIMULATION)

(B) IN-HOSPITAL CLINICAL

CLINICAL EXPERIENCE FOR LEVEL II PROGRAMS IS A MANDATORY REQUIREMENT FOR ACCREDITATION. A SATISFACTORY PRACTICUM MUST INCLUDE A MINIMUM OF FORTY (40) HOURS OF SUPERVISED HOSPITAL EXPERIENCE.

(A) AIRWAY MANAGEMENT (IN OPERATING ROOM AND/OR POST-ANESTHESIA RECOVERY ROOM	8 HRS.
(B) CLINICAL ASSESSMENT (IN EMERGENCY DEPARTMENT OR APPROPRIATE CLINICAL SETTING)	32 HRS. <hr/> <hr/>
TOTAL	40 HRS.

(C) ON-CAR PRACTICUM

SUFFICIENT ON-CAR EXPERIENCE IS REQUIRED TO PERMIT THE SAFE APPLICATION OF ALL LEVEL II PROCEDURES.

ON-CAR PRACTICUM

(TIME AS REQUIRED)

CHAPTER 3

MINIMUM COMPETENCY REQUIREMENTS

LEVEL III EMERGENCY MEDICAL ATTENDANT PROGRAMS

PREPARED FOR THE

CONJOINT COMMITTEE ON ACCREDITATION

OF EDUCATIONAL PROGRAMS FOR

EMERGENCY MEDICAL ATTENDANTS

MAY 1980

INTRODUCTION

NEED FOR LEVEL III EMA

STUDIES HAVE DEMONSTRATED THAT THE AVAILABILITY OF PROPERLY TRAINED ADVANCED LIFE SUPPORT EMERGENCY MEDICAL ATTENDANTS CAN SAVE THE LIVES OF SOME VICTIMS OF ACCIDENT OR ILLNESS WHO WOULD NOT SURVIVE THE TRIP TO HOSPITAL EMERGENCY FACILITIES.

DELEGATED MEDICAL RESPONSIBILITIES

THE LEVEL III EMA IS TRAINED TO PERFORM, UNDER MEDICAL DIRECTION, SPECIFIC MEDICAL ACTS INCLUDING INTUBATION, CARDIAC MONITORING AND DEFIBRILLATION, AND DRUG THERAPY.

REQUIREMENTS FOR ACCREDITATION

STUDENT SELECTION

PROGRAMS WILL SHOW EVIDENCE OF CARE IN SELECTION OF STUDENTS. DEMONSTRATED COMPETENCY IN LEVEL I MUST BE REQUIRED AS A PREREQUISITE FOR ADMISSION TO A LEVEL III PROGRAM. IN ADDITION, THE SELECTION PROCESS MIGHT INCORPORATE:

- (A) PRESCREENING BY STANDARD APTITUDE TESTS FOR READING COMPREHENSION AND VERBAL AND COMMUNICATION SKILLS AS WELL AS FOR ABSTRACT AND MECHANICAL REASONING;
- (B) FURTHER SELECTIONS BY CLINICAL TESTING OF BASIC AMBULANCE KNOWLEDGE;
- (C) FURTHER SELECTIONS BY A COMBINATION OF GROUP INTERVIEWS AND PEER REVIEW.

PROGRAMS SEEKING ACCREDITATION MUST INCLUDE TRAINING OBJECTIVES SPECIFIED AND BE ABLE TO DEMONSTRATE THAT THEY INCLUDE ALL ACADEMIC AND CLINICAL PERFORMANCE COMPONENTS NECESSARY TO PRODUCE COMPETENT QUALIFIED PRACTITIONERS.

LEVEL III PROGRAMS MAY ACCEPT CANDIDATES WHO HAVE COMPLETED LEVEL I AND/OR LEVEL II, DEPENDING ON LOCAL REQUIREMENTS AND ARRANGEMENTS. THE COMPETENCES INCLUDED IN THE LEVEL III REQUIREMENTS ACCORDINGLY ENCOMPASS LEVEL II REQUIREMENTS. LEVEL III PROGRAMS DEALING WITH GRADUATES OF LEVEL II WILL NOT NEED TO COVER SOME OF THESE WHILE OTHERS MAY REQUIRE COVERAGE TO PROVIDE ADDITIONAL DEPTH.

IN THE DETAILED PRESENTATION OF LEVEL III REQUIREMENTS WHICH FOLLOWS, ITEMS MARKED WITH A SINGLE ASTERISK ARE THOSE WHICH MAY BE OMITTED FOR STUDENTS WHO HAVE COMPLETED LEVEL II; A DOUBLE ASTERISK IDENTIFIES ITEMS PARTIALLY COVERED IN LEVEL II AND WHICH MAY BE COVERED IN FEWER HOURS THAN SUGGESTED.

SUGGESTED MINIMUM HOURS FOR MAJOR DIDACTIC ELEMENTS ARE LISTED ON PAGE 61, TOGETHER WITH A DETAILED LIST OF SUGGESTED LEVEL II CREDIT HOURS - I.E. THE SUGGESTED NUMBER OF HOURS BY WHICH THE COURSE MIGHT BE REDUCED FOR RECENT LEVEL II GRADUATES.

OTHER DETAILED REQUIREMENTS RELATED TO PROGRAM ADMINISTRATION, POLICY AND FACILITIES ARE LISTED IN THE BASIS OF ACCREDITATION.

REQUIRED COMPETENCES

TO BE ELIGIBLE FOR ACCREDITATION, LEVEL III EDUCATIONAL PROGRAMS MUST PROVIDE ADEQUATE INSTRUCTION IN THE FOLLOWING ADVANCED LIFE SUPPORT TECHNIQUES:

- * (A) INTRAVENOUS THERAPY;
- (B) CARDIAC MONITORING AND ARRYTHMIA INTERPRETATION;
- (C) CARDIOVERSION AND DEFIBRILLATION;
- ** (D) AIRWAY MANAGEMENT AND ENDOTRACHEAL INTUBATION;
- * (E) APPLICATION OF PNEUMATIC ANTISHOCK GARMENTS;
- (F) TREATMENT OF CARDIAC ARREST ACCORDING TO ADVANCED CARDIAC LIFE SUPPORT STANDARDS OF THE CANADIAN HEART FOUNDATION;
- * (G) USE OF N₂O;
- (H) USE OF OTHER PERMITTED SPECIAL TECHNIQUES AND EMERGENCY DRUGS.

LEVEL III GRADUATES MUST BE COMPETENT IN APPLYING THESE SPECIAL PROCEDURES, UNDER PHYSICIAN DIRECTION, TO THE ACUTELY ILL AND INJURED PATIENT.

MAJOR LEVEL III PROGRAM COMPONENTS

TO BE ELIGIBLE FOR ACCREDITATION, LEVEL III PROGRAMS MUST INCLUDE CLEARLY-DEFINED AND COMPREHENSIVE DIDACTIC, CLINICAL (IN-HOSPITAL), AND PRACTICAL (ON-CAR) COMPONENTS. COLLECTIVELY, THESE COMPONENTS MUST PROVIDE INSTRUCTION AND SUPERVISED EXPERIENCE RELATED TO ALL REQUIRED LEVEL III COMPETENCES. ONE ARRANGEMENT WHICH MEETS ACCREDITATION REQUIREMENTS TREATS EACH OF THESE COMPONENTS AS SEPARATE SEMESTERS.

DETAILS OF EACH OF THESE THREE SEMESTERS FOLLOW.

CURRICULUM AND PERFORMANCE OBJECTIVES
COMPRISING LEVEL III COMPETENCY REQUIREMENTS

(A) DIDACTIC COMPONENT (FIRST SEMESTER)

A SATISFACTORY CURRICULUM WILL INCLUDE ALL OF THE
FOLLOWING:

- (1) INTRODUCTION: COURSE OUTLINE/EVALUATION
PROCEDURE/COURSE OBJECTIVES
- * (2) PROFESSIONALISM
 - MEDICAL ETHICS
 - MEDICO-LEGAL RESPONSIBILITIES AND CONSIDERATIONS
- * (3) MEDICAL TERMINOLOGY
 - DEFINITIONS
 - SPELLING
 - SUFFIXES/PREFIXES/ROOTS
- ** (4) BASIC SCIENCES
 - FLUID AND ELECTROLYTE BALANCE
 - ACID-BASE BALANCE
- ** (5) PATIENT ASSESSMENT
 - PRIMARY SURVEY
 - SECONDARY SURVEY
 - VITAL SIGNS
 - HISTORY AND PHYSICAL EXAM
- (6) PHARMACOLOGY
 - CALCULATION OF DOSAGES

- PRINCIPLES OF ABSORPTION, DISTRIBUTION, METABOLISM AND EXCRETION OF DRUGS
- SPECIFIC DRUG INFORMATION:
 - THERAPEUTIC ACTION
 - INDICATIONS
 - CONTRAINDICATIONS
 - DOSAGES
 - SIDE EFFECTS
 - PRECAUTIONS
- PRINCIPLES OF SAFE DRUG ADMINISTRATION
- SKILL PRACTICE IN INTRAVENOUS, INTRAMUSCULAR AND SUBCUTANEOUS DRUG ADMINISTRATION

CORE DRUGS

- EPINEPHRINE
- AMINOPHYLLINE
- ATROPINE
- BENADRYL
- CALCIUM CHLORIDE
- DEXTROSE 50%
- DIAZEPAM
- LASIX
- ISUPREL
- LIDOCAINE
- MORPHINE
- NARCAN
- NITROGLYCERINE
- SODIUM BICARBONATE

** (7) CARDIOVASCULAR STUDIES

- CARDIOVASCULAR ANATOMY AND PHYSIOLOGY
- PATHOPHYSIOLOGY, SIGNS AND SYMPTOMS, ASSESSMENT TECHNIQUES AND TREATMENT FOR:

- ANGINA/CORONARY ARTERY DISEASE
- ACUTE MYOCARDIAL INFARCTION
- CONGESTIVE HEART FAILURE
- CARDIOGENIC SHOCK
- SYNCOPE
- HYPERTENSIVE STATES
- SUDDEN CARDIAC DEATH

(8) ELECTROCARDIOLOGY

- INTRODUCTION ELECTROPHYSIOLOGY
- PRINCIPLES OF MONITORING
- DYSRHYTHMIA INTERPRETATION

- A. SINUS: RHYTHM
BRADYCARDIA
TACHYCARDIA
ARRHYTHMIA
PAUSE/ARREST
- B. ATRIAL: ECTOPIC BEATS
TACHYCARDIA
FLUTTER
FIBRILLATION
- C. JUNCTIONAL: RHYTHM
ECTOPIC BEATS
TACHYCARDIA
- D. VENTRICULAR: IDIOVENTRICULAR RHYTHM
ECTOPIC BEATS
TACHYCARDIA
FIBRILLATION
ASYSTOLE

- E. BLOCKS: 1^o AV BLOCK
2^o AV BLOCK
3^o AV BLOCK

F. PACEMAKER RHYTHMS

(9) ADVANCED CARDIAC LIFE SUPPORT

- DEFIBRILLATION
- DRUG THERAPY

N.B. PLEASE NOTE THAT END BRACKETTED ITEMS IN (10)
AND (11) REQUIRE FULL COVERAGE BY LEVEL II
GRADUATES

** (10) RESPIROLOGY

- ANATOMY AND PHYSIOLOGY OF THE RESPIRATORY SYSTEM
- PATHOPHYSIOLOGY SIGNS AND SYMPTOMS, ASSESSMENT TECHNIQUES AND TREATMENT OF:
 - ACUTE RESPIRATORY FAILURE
 - CHRONIC RESPIRATORY FAILURE
 - AIRWAY OBSTRUCTION
 - PULMONARY EDEMA)
 - TOXIC INHALATION)
 - DROWNING)
 - PULMONARY EMBOLISM)
 - HYPERVENTILATION SYNDROME
- OXYGEN THERAPY

** (11) CENTRAL NERVOUS SYSTEM

- CNS ANATOMY AND PHYSIOLOGY
- PATHOPHYSIOLOGY SIGNS AND SYMPTOMS, ASSESSMENT TECHNIQUES AND TREATMENT OF:
 - CNS TRAUMA
 - SEIZURE DISORDERS)

- CEREBROVASCULAR ACCIDENT
- COMA)

* (12) TRAUMA

- REVIEW OF TRAUMA FIRST AID PRINCIPLES
- TRIAGE
- SIGNS AND SYMPTOMS, ASSESSMENT. TECHNIQUES AND TREATMENT OF:
 - BURNS
 - MUSCULOSKELETAL TRAUMA
 - CNS TRAUMA (REVIEW)
 - CHEST TRAUMA
 - MULTIPLE TRAUMA
 - GUNSHOT WOUNDS
 - ABDOMINAL TRAUMA
- SHOCK PATHOPHYSIOLOGY AND TREATMENT
- ORIENTATION FOR PARTICIPATION IN DISASTER SITUATIONS

** (13) MEDICAL AND SURGICAL EMERGENCIES

- PATHOPHYSIOLOGY, SIGNS AND SYMPTOMS, ASSESSMENT TECHNIQUES TO ASSIST PHYSICIAN DIAGNOSIS AND INITIATE TREATMENT OF:
 - HYPOGLYCEMIA
 - HYPERGLYCEMIA
 - ANAPHYLACTIC REACTION
 - HYPOTHERMIA AND HYPERTHERMIA
 - POISONING
 - DRUG OVERDOSE
 - ALCOHOL ABUSE AND OVERDOSE
 - ACUTE ABDOMINAL PROBLEMS

(14) PEDIATRICS

- APPROACH TO THE PEDIATRIC PATIENT

- PATHOPHYSIOLOGY, SIGNS AND SYMPTOMS, ASSESSMENT AND TECHNIQUES, AND MANAGEMENT OF:
 - ASTHMA
 - ACUTE AIRWAY OBSTRUCTION
 - SUDDEN INFANT DEATH SYNDROME
 - SEIZURES
 - CHILD ABUSE

SKILLS AND TECHNIQUES

THE SUGGESTED CURRICULUM IS DESIGNED TO PREPARE STUDENTS FOR ACQUISITION OF COMPETENCE IN ALL OF THE FOLLOWING REQUIRED SKILLS:

SKILLS FROM LEVEL I INCLUDING:

1. OXYGEN ADMINISTRATION VIA MASK, NASAL CANNULA
2. USE OF BAG-VALVE-MASK UNIT
3. SUCTIONING
4. POSITIVE PRESSURE VENTILATION TECHNIQUES
5. CPR - ADULT, CHILD AND INFANT

SPECIFIC LEVEL III SKILLS:

- * 1. MEDICAL HISTORY AND PHYSICAL EXAM
- * 2. PERIPHERAL VENIPUNCTURE
- * 3. IV FLUID ADMINISTRATION INCLUDING RATE CALCULATION
- * 4. BLOOD SAMPLING
- * 5. APPLICATION OF PASG
- 6. DRUG ADMINISTRATION
 - (A) DRAWING UP MEDICATIONS FROM VIAL AND AMPOULE
 - (B) PREPACKAGED DISPOSABLE SYRINGE
 - (C) SUBCUTANEOUS

(D) INTRAMUSCULAR

(E) INTRAVENOUS

(F) ENDOTRACHEAL

7. DIRECT LARYNGOSCOPY

* 8. FOREIGN BODY REMOVAL FROM AIRWAY - DIRECT TECH-
NIQUES

9. ENDOTRACHEAL INTUBATION

10. CARDIAC MONITORING

12. DEFIBRILLATION AND CARDIOVERSION

13. ROTATING TOURNIQUETS

14. PHLEBOTOMY

15. NASOGASTRIC INTUBATION

16. USE OF APPROPRIATE ANALGESICS

OPTIONAL SKILLS: ADDITIONAL SKILLS MAY BE REQUIRED BY
LOCAL AUTHORITIES; ACCREDITATION
REQUIRES INCLUSION IN LEVEL III PRO-
GRAMS OF CURRICULUM AND SUPERVISED
EXPERIENCE (IN-HOSPITAL AND ON-CAR)
WHICH WILL PERMIT STUDENT MASTERY OF
ALL OF THE LISTED SKILLS (MINIMUM
REQUIREMENT).

SUGGESTED HOURS: (1ST SEMESTER - DIDACTIC)

	LEVEL III SUGGESTED <u>MINIMUM HOURS</u>	*LEVEL II <u>CREDIT HOURS</u>
CARDIOLOGY	50 HOURS	10 HOURS
RESPIROLOGY	20 HOURS	10 HOURS
NEUROLOGY	15 HOURS	10 HOURS
PHARMACOLOGY	25 HOURS	
SKILLS	25 HOURS	20 HOURS
MISCELLANEOUS	30 HOURS	
EXAMS	25 HOURS	
PRACTICAL SESSIONS	<u>40 HOURS</u>	<u> </u>
TOTAL	230 HOURS	50 HOURS

* POST LEVEL II TOTAL: 180 HOURS

(B) CLINICAL (IN-HOSPITAL) TRAINING (SECOND SEMESTER)

THE REQUIRED IN-HOSPITAL TRAINING UNDER THE DIRECTION OF A PHYSICIAN AND CLINICAL INSTRUCTORS WITH EXTENSIVE EXPERIENCE IN ACUTE CARE AREAS IS NORMALLY ACHIEVED IN A SEPARATE (SECOND) SEMESTER. ASSIGNMENT SHOULD BE BY ROTATIONS THAT ATTEMPT TO INCORPORATE THE STUDENTS INTO THE DAILY ACTIVITIES OF THE HOSPITAL. INTEGRATION OF THE ADVANCED LIFE SUPPORT PROGRAM WITH THE ACUTE CARE AREAS OF THE HOSPITAL, ESPECIALLY THE EMERGENCY DEPARTMENT, SHOULD BE A HIGH PRIORITY OBJECTIVE OF THE TRAINING PROGRAM. THE FOLLOWING SCHEDULE OF ROTATIONS OR AN OVERALL EQUIVALENT ACCEPTABLE TO THE COMMITTEE IS REQUIRED:

CLINICAL ROTATIONS

- ** (A) OPERATING ROOM - ASSIGNED TO AN ANAESTHETIST DURING THE O.R. SLATE.

OBJECTIVES - PROFICIENCY IN ALL ASPECTS OF AIRWAY MANAGEMENT INCLUDING ENDOTRACHEAL INTUBATION, AND THE MANAGEMENT OF THE UNCONSCIOUS PATIENT (IN THE POST-ANESTHESIA RECOVERY ROOM)

SUGGESTED HOURS - 100

LEVEL II CREDITS - 20

- * (B) LABORATORY - ASSIGNED TO A TECHNICIAN.

OBJECTIVES - TO LEARN ABOUT THE BASIC PRINCIPLES OF BLOOD CHEMISTRY, CROSSMATCHING AND LABORATORY TECHNIQUES

SUGGESTED HOURS - 8

LEVEL II CREDITS - 8

- * (C) IV THERAPY - ASSIGNED TO A MEMBER OF HOSPITAL IV TEAM.

OBJECTIVES - TO GAIN EXPERIENCE IN ROUTINE
VENIPUNCTURE AND INTRAVENOUS THERAPY

SUGGESTED HOURS - 30

LEVEL II CREDITS - 30

(D) ICU - ASSIGNED TO NURSE CLINICAL INSTRUCTOR.

OBJECTIVES - TO UNDERSTAND BASIC ASPECTS OF
ROUTINE CARE PROVIDED FOR THE CRITICALLY ILL
SUGGESTED HOURS - 16

(E) CCU - ASSIGNED TO NURSE CLINICAL INSTRUCTOR

OBJECTIVES - TO GAIN EXPERIENCE IN ROUTINE
ASPECTS OF CORONARY MANAGEMENT, FOLLOW-UP
PHYSICAL ASSESSMENTS, AND TO GAIN EXPERIENCE
IN CARDIAC MONITORING AND ARRHYTHMIA
DETECTION.

SUGGESTED HOURS - 64

(F) EMERGENCY DEPARTMENT - ASSIGNED TO NURSE CLINICAL
INSTRUCTOR

OBJECTIVES - TO GAIN EXPERIENCE IN REGULAR
EMERGENCY DEPARTMENT ACTIVITIES, AND
ESPECIALLY IN EMERGENCY ASSESSMENT AND MANAGE-
MENT OF THE CRITICALLY ILL; IN ADDITION, TO
FOSTER THE INTEGRATION OF FUNCTIONS WITH
EMERGENCY DEPARTMENT STAFF. INCLUDES
INDIVIDUALIZED TEACHING BY EMERGENCY
PHYSICIANS: ONE-ON-ONE ASSIGNMENT TO AN
EMERGENCY PHYSICIAN WHO IS OFF DUTY IN ORDER
TO PRACTISE HISTORY-TAKING AND CLINICAL
ASSESSMENT SKILLS ON IN-HOSPITAL OR IN-
EMERGENCY DEPARTMENT PATIENTS.

SUGGESTED HOURS - 112

LEVEL II CREDITS - 20

(G) MORGUE - ASSIGNED TO PATHOLOGIST

OBJECTIVE - TO IMPROVE KNOWLEDGE OF GROSS ANATOMY, ESPECIALLY AS RELATES TO SURFACE FEATURES.

SUGGESTED HOURS - 16

(H) OPTIONS - ASSIGNMENT TO APPROPRIATE PHYSICIAN MAY PERMIT EXTRA EXPERIENCE IN MANAGEMENT OF THE CRITICALLY ILL, RESPIRATORY STRESS TESTING LAB, RESPIROMETRY LAB, CARDIAC CATHETER LAB, RESPIRATORY THERAPY DEPARTMENT, ETC.

SUGGESTED HOURS - 20

(TOTAL TIME POST LEVEL II: - 288)

(TOTAL LEVEL II CREDIT: 78)

TOTAL SUGGESTED HOURS: 366

(C) PRACTICAL (ON-CAR) TRAINING (THIRD SEMESTER)

THE INTEGRATION, FOR THE STUDENTS, OF WHAT HAS BEEN LEARNED IN THE HOSPITALS WITH THE NEEDS OF THE WORKPLACE IS ACHIEVED IN THE ON-CAR PROGRAM COMPONENT, USUALLY ARRANGED AS A THIRD SEMESTER. THIS COMPONENT SHOULD INCLUDE THE FOLLOWING ELEMENTS OR THEIR EQUIVALENTS:

(A) EMERGENCY DEPARTMENT DUTY

STUDENTS ARE ENCOURAGED TO WORK WITH E.R. STAFF "BETWEEN CALLS". SUPERVISION MAY BE BY HEAD NURSE AND/OR EMERGENCY PHYSICIAN. OBJECTIVE IS FURTHER INTEGRATION WITH EMERGENCY DEPARTMENT ACTIVITIES AND INCREASED EXPOSURE TO EMERGENCY ASSESSMENT AND MANAGEMENT OF THE CRITICALLY ILL.

SUGGESTED TIME (AS AVAILABLE)

(B) ON-CAR DUTY AS AN ADVANCED LIFE SUPPORT ATTENDANT PREFERABLY JOINED WITH A GRADUATE ALS ATTENDANT

SUGGESTED TIME (4 TO 6 MONTHS)

(C) ON-CAR ASSESSMENT OF FUNCTIONING AT ALS LEVEL BY:

- (1) EMERGENCY PHYSICIANS
- (2) NURSE CLINICAL INSTRUCTOR
- (3) SENIOR GRADUATE ALS ATTENDANT

SUGGESTED TIME (AS REQUIRED)

INTER-RELATEDNESS OF PROGRAM COMPONENTS

ACCREDITATION WILL BE CONCERNED TO ENSURE THAT THE DIDACTIC, IN-HOSPITAL AND ON-CAR COMPONENTS OF THE LEVEL III PROGRAM ARE SATISFACTORILY INTER-RELATED AND MUTUALLY REINFORCING. ACCREDITATION WILL ALSO BE CONCERNED TO ENSURE THAT STUDENTS ARE IN A LEARNING

ENVIRONMENT AND THAT THEIR ASSIGNMENT OF WORKING RESPONSIBILITIES IS GOVERNED PRIMARILY BY EDUCATIONAL CONCERNS AND NOT DICTATED SOLELY BY SERVICE REQUIREMENTS.

SUGGESTIONS FOR STUDENT EVALUATION

THE USE OF FREQUENT "QUIZZES" OR SHORT TESTS ON A DAY-TO-DAY BASIS IS ENCOURAGED. FORMAL OVERALL EVALUATION SHOULD BE CONDUCTED AT THE END OF EACH SEMESTER. THE END OF THE IN-HOSPITAL CLINICAL (SECOND) SEMESTER AND THE ON-CAR (FINAL) SEMESTER ARE CRITICAL EVALUATION POINTS; STUDENTS MUST BE CAREFULLY EVALUATED TO ENSURE ACQUISITION OF APPROPRIATE SKILLS.

EVALUATION PROCESSES SHOULD BE TAILORED TO FIT THE NEEDS OF PARTICULAR COURSES AND ACCREDITATION DOES NOT STIPULATE SPECIFIC PROCESSES. HOWEVER, THE FOLLOWING EVALUATION PROCESSES ARE COMMONLY EMPLOYED:

- (A) WRITTEN EXAMINATIONS - SHOULD CONSIST OF A MIXTURE OF OBJECTIVE QUESTIONS AND SHORT ANSWER QUESTIONS. AS A RULE, IT IS WISE TO AVOID EITHER RELYING COMPLETELY ON OBJECTIVE TESTS ON THE ONE HAND, OR VERY LONG ESSAY-TYPE EXAMINATIONS ON THE OTHER.
- (B) ORAL EXAMINATIONS - ARE BY NATURE VERY FLEXIBLE AND CAN BE USED TO IDENTIFY INDIVIDUAL VARIABILITY. FREQUENTLY, MOST USEFUL AS PART OF FINAL EVALUATION PROCESS.
- (C) PRACTICAL EXAMINATIONS - TESTING TECHNICAL SKILLS IS BEST DONE IN THE O.R. SETTING BECAUSE IT ALLOWS ONE TO "DIFFUSE" THE PRESSURE ON THE STUDENT. THE EXAMINER MAY ALLOW AS MANY CHANCES AS HE/SHE FEELS

ARE REASONABLE TO DEMONSTRATE COMPETENT TECHNICAL PERFORMANCE.

- (D) TESTING ASSESSMENT SKILLS IS MORE DIFFICULT AND MAY BE DONE BY "ROLE-PLAYING" OR BY DIRECT ON-CAR OBSERVATION. THE LATTER IS PREFERRED.

ACCREDITATION WILL BE CONCERNED TO ENSURE THAT FORMAL EVALUATION PROCESSES ARE IN PLACE, THAT THEY ARE CAREFULLY ORGANIZED AND APPROPRIATE, AND THAT STUDENTS ARE INFORMED WITH RESPECT TO HOW THEY WILL BE ASSESSED (SEE ALSO BASIS OF ACCREDITATION).

CONTINUING EDUCATION

NO ADVANCED LIFE SUPPORT PROGRAM SHOULD BE CONSIDERED ENDED AFTER THE FINAL EXAMINATION. THE VERY NATURE OF A PROGRAM WHICH ALLOWS INTERVENTIONS WITH THE POTENTIAL TO CAUSE PHYSICAL HARM, COUPLED WITH THE RAPIDLY CHANGING FIELD OF EMERGENCY MEDICINE DEMANDS ACTIVE IN-SERVICE EDUCATION ARRANGEMENTS. ALL LEVEL III PROGRAMS SHOULD DEMONSTRATE THAT THEY ARE CONSCIOUS OF THE NEED, BOTH FOR THEIR GRADUATES AND FACULTY. ACCREDITATION CANNOT PRESCRIBE HOW PROGRAMS MEET SUCH NEEDS, BUT EXPECTS TO SEE EVIDENCE OF EFFORT. PROGRAMS ARE ALSO EXPECTED TO COOPERATE WITH LOCAL AUTHORITIES WHERE THERE IS PROVISION FOR ACTIVITIES SUCH AS:

- (A) MANDATORY RE-LICENSING PROCEDURE AT REGULAR INTERVALS (E.G., 3 YEARS);
- (B) ROUTINE REVIEW OF ALL CALLS REQUIRING ALS INTERVENTION, ALONG WITH THE PROVISION OF REGULAR FEEDBACK TO THE ATTENDANTS INVOLVED;
- (C) REGULAR MONTHLY TEACHING SESSIONS;

(D) RECERTIFICATION IN SELECTED TECHNIQUES (E.G. CARDIO-PULMONARY RESUSCITATION, INTUBATION) AT REGULAR INTERVALS.

APPENDIX 10-A

SUGGESTED FIRST AID CONTENT FOR RESCUE VESSEL CREWS

INTRODUCTION

This course has been designed for crews of standby vessels which are equipped with fast rescue craft. The course also recognizes the OGLA regulation which indicates the vessel should be equipped to treat ten extensive second degree burns, five limb fractures and five cases of hypothermia. Victims with second degree burns require fluid resuscitation therefore instruction in intravenous techniques is conducted. Near drowning seems a probably condition of victims recovered from the water with which the standby vessel crew will have to cope therefore instruction includes the use of oropharyngeal airways of ten Guedel or Brooks type (not oesophageal obturator airways) and oxygen apparatus including the self inflating bag air mask type of resuscitator. Basic Cardiac Life Support training is conducted.

Ship's masters have some medical training as part of their qualification and routinely maintain an inventory of drugs and when necessary administer them. The necessity of consulting a shore base physician prior to administering drugs and maintaining careful control of drugs acting on the central nervous system are emphasized.

APPENDIX 10-A

SUGGESTED FIRST AID CONTENT FOR RESCUE VESSEL CREWS

Day 1

Stretcher handling and First Aid	2 hours
Assessment of the trauma victim	
Moving the trauma victim	
Head injuries	
Neck and spine injuries	
Injuries to the limbs	
Cardiopulmonary resuscitation	
To Canadian Health Association standards - Intravenous therapy	6 hours

Day 2

First Aid	2 hours
Bleeding and shock	
Chest injuries	
Abdominal injuries	
Pelvic injuries	
Eye injuries	

Day 3

<u>Burns</u>	1 hour
Assessment of the burn patient	
Fluid requirements	
Airway burns	
Analgesia and continuing management	

<u>Drowning</u>	2 hours
Handling the drowning victim	
Assessment of the drowning victim	
First Aid in drowning	
Further management of the drowning victim	
Complications in drowning	
Oil contamination	1 1/2 hours
Skin contamination	
Airway contamination	
Gut contamination	
<u>Hypothermia</u>	2 hours
Physiological changes	
Assessment in hypothermia	
Handling the hypothermia victim	
Methods of rewarming	
Controversial aspects of hypothermia management	
Complications in hypothermia	
<u>Record keeping</u> , communications and patient	1 hour
Transfers	
Patient identification	
Description of problems	
Management history	
Communicating with medical personnel	
Handing over	

Day 4

Pick up survivors (dummies). Transfer to supply vessel. 4 hours
From boat and ocean. Treat for injuries and
hypothermia. Transport to hospital.
Debriefing and discussion 2 hours

APPENDIX 11-A

AMBULANCE SUPPLIES AND EQUIPMENT

Medical Equipment and Supplies

Equipment storage space

Medical Supplies Cabinet

(floor to ceiling 60 cm wide x 8 cm deep)

I.V. hook or pole

Ambulance cot

multi-level

water-proof covered mattress

restraint belts

Folding stretcher with restraint belts

Oxygen Equipment

2 cylinders (72 cm x 10 cm)

regulator & flow meter assembly

face masks (asst. sizes)

Portable suction apparatus

Resuscitator

Fracture boards

spinal (180 cm x 40 cm)

neck (85 cm x 45 cm)

Splint set - cardboard, plastic or inflatable

Lower limb traction apparatus (Thomas splint)

Bed pan

Urinal

Emesis basin

Airways - adult & child

Positioning bags (2)

Bandages

6 - Kling type (2.5 cm wide)

6 - Kling type (7.5 cm wide)

6 - Kling type (15 cm wide)

12 triangular slings

Sterile dressings

24 - gauze pads (10 cm x 10 cm)

12 - pressure pads

6 - eye pads

Adhesive tape

3 rolls (2.5 cm wide)

3 rolls (5.0 cm wide)

3 rolls (7.5 cm wide)

Scissors

Bandage

Utility or household

25 large safety pins

Deodorant spray (i.e., Lysol or San Vieno)

Splinter and dressing tweezers (1)

Adhesive dressing (asst. sizes - band-aid type)

4 Blankets

4 Cotton sheets

4 Plastic sheets

2 Pillows

4 Linen pillow cases

2 Plastic pillow cases

Fluid containers - pliable type

TRANSPORTATION APPENDIX 11-B

Canadian Coast Guard Vessels SAR Characteristics

	<u>Crenfell</u>	<u>Jackman</u>	<u>Sir John Franklin</u>	<u>John Cabot</u>	<u>Sir Humphrey Gilbert</u>	<u>Bartlett</u>
Home Base	St. John's	St. John's	St. John's	St. John's	St. John's	St. John's
Dimensions						
Length	182'06"	184'	322'	313'4"	200'	189'5"
Breadth	8'08"	19'11"	23'6"	22'	18'	12'6"
Beam	26'06"	45'	64'	60'	48'	42'10"
Horsepower	640	6560 BHP	13,600 SHP	2(450v SHP Diesel electric)	4,000	2,100 BHP
Speed	9.5 knots	11 knots cruising 14 knots max.	12 knots cruising 14 knots max.	16 knots cruising 14 knots max.	12.5 knots	11 knots
No. of crew	10	16	55	84	28	37
Range (N/A)	1500	12,000	15,000	10,000	9,000	3,835
Communications	HF VHF-FM AIG C.B.	HF VHF-FM AIG C.B.	HF/CW VHF-FM Triton RTT SSB AG	HF RT HF-CW VHF-FM VHF-AM	HF VHF-FM AIG	HF AT VHF-FM CB AIG
Prime Duty	Buoy tender/ supply	Search and rescue	Search and rescue	Heavy Icebreaker	Medium class icebreaker Lighthouse supply Buoy tending	Buoy vessel/supply

Canadian Coast Guard Vessels SAR Characteristics

2

TRANSPORTATION APPENDIX 11-B

Canadian Coast Guard Vessels SAR Characteristics

<u>Skidgate</u>	<u>Grenfell</u>	<u>Jackman</u>	<u>Sir John Franklin</u>	<u>John Cabot</u>	<u>Sir Humphrey Gilbert</u>	<u>Bartlett</u>
	Boston Whaler 2 outboard motors 85 hp	Flotable survival suits 12 Portable air compressor Stretchers 2 Portable generator 1 Crane				
Firefighting equipment	Fire Monitor 480 gal. P M Fire pump 120 gal. P M Fixed CO ₂ 814 lb. Portable ext. Foam system Smoke helmets 4 Fire suits 2 Portable gas pump 80 gal. P M Portable generator (gas)	Fire suits 2 Fire Monitor 480 gal./min. Fire pump 120 gal./min. Fixed CO ₂ 825 lb. Portable extinguishers Air Packs 4 Portable gas pump 80 gal./min.	Foam generator Ansol AAF Foam Generator CO ₂ system Submersible pump 2 Smoke helmets 2 Fire suits 4 Portable extinguishers Breathing apparatus 6	Foam generator CO ₂ system Submersible pump Oxygen resuscitator (Lyteport II) Scott Air Packs 4 (7 spare bottles) Fireman outfits 2	Portable pumps 2 (100 GPM) Self-contained breathing apparatus 3 (2 Scott; 1 Survive Air) Scott Air Packs 3 Fireman suits 2 CO ₂ system Foam generator Submersible electric pump 1 (120 GPM)	CO ₂ system Deck pumps - General service 34/75 ton per H Scott Air Packs 3 60 min. each Fire pump 25/70 ton Fireman outfits 2 Emergency fire pump 25 ton 143 GPM 20 gals. Foam 1 Applicator SPEE Gorman breathing apparatus 1
	Foam system Smoke helmets 4 Fire suits 2 Portable gas pump 80 gal. P M Portable generator (gas)	Portable extinguishers Air Packs 4 Portable gas pump 80 gal./min.	Fire suits 4 (7 spare bottles) Fireman outfits 2			

Source: Canadian Coast Guard, St. John's Office

TRANSPORTATION - APPENDIX 11-C

103 Rescue Unit
Canadian Armed Forces

Universal Helicopters
Newfoundland Limited

Sealand Helicopters Limited

Service is accessed
by contacting:

Rescue Centre Coordination Centre
Halifax
902-426-4730

Universal
709-576-4660
709-576-4661

Bill Stephens 576-4911 (office)
753-2117 (residence)
Fred Sparling 576-4911 (office)
364-3162 (residence)

Location of
operations base:

Gander, Newfoundland
103 RU 256-7151 Loc. 342

St. John's, Newfoundland
St. Alban's
Deer Lake
Gander
Goose Bay, Labrador
Halifax, Nova Scotia

Aircraft

Type:

Number:

Engines:

CH113 Labrador
3 aircraft
2 turboshaft

Sikorsky S-61N
3 aircraft
Twin engine

AS355F St. John's

twin

AS332L

medium twin

*206B

Light single

*206B

Light single

*206B

Light single

*206L

Light single

*AS350D

Light single

*AS332

Medium twin

205A1

Medium single

St. Alban's

Deer Lake

Gander

Goose Bay

TRANSPORTATION - APPENDIX 11-C

<u>103 Rescue Unit</u> <u>Canadian Armed Forces</u>		<u>Universal Helicopters</u> <u>Newfoundland Limited</u>	<u>Sealand Helicopters Limited</u>
Range:	600 NM (250NM radius W/45min loiter on scene)	500 miles	+AS332 medium twin 300SM
Endurance:	5 hrs. 30 mins.	3.9 hrs. with auxiliary fuel load)	206B
Speed:	148 KIAS maximum (normal 125 KIAS)	115 knots/hour	206L
			AS350D
			205A1
			332C/L
Load Dimensions of Cargo Compartment	max. width 6 ft. max. height 6 ft. max. length 24 ft. basic 13,000 lbs. fuel/cargo 8,400 lbs. max. weight 21,400 lbs.	N/A N/A	2.7 hrs. 125 mph. 350 SM 3.0 hrs. 135 mph. 375 SM 3.3 hrs. 135 mph. 235 SM 2.3 hrs. 105 mph. 850 SM 5.5 hrs. 155 mph. N/A
Weight Capacity		Operational weight 13,000 lbs. Useful load 7,500 lbs. max. weight 20,500 lbs.	
*Litter equipped +Rescue equipped			
IFR	Capable of IFR flight but prohibited from flight into icing conditions	13,000 lbs.	AS332 series (all weather) AS355F day/night VFR other day VFR only

TRANSPORTATION - APPENDIX 11-C

103 Rescue Unit
Canadian Armed Forces

Universal Helicopters
Newfoundland Limited

Sealand Helicopters Limited

Communications system on board helicopters	VHF/AM air/air/air/gnd civil control frequencies VHF/FM air/ship air/gnd police emergency facilities UHF/AM air/air comms. HF/SSB air/gnd long range comms. Loudhailer Portable VHF/FM VHF/AM radios	2 VHF radios 1HF radio with Universal frequency and Mobil emergency frequency (4601.5)	VFR HF/SSB
---	---	---	---------------

Crew complement total *5

2 pilots: Captain
First Officer

IFR helicopters: 2 crew: Pilot
Co-pilot
VFR helicopters: 1 crew: Pilot

*may be supplemented as required by specific missions

Crew Medical Training

All crew members: basic first aid
SAR Technicians :EMT-2 level

Helicopter emergency procedures

Limited

Search lighting
(night lighting)

3.8 million CP nite sun search
2 X aircraft searchlights

High intensity landing lights

Searchlights (332C/L only)

Hoisting capability

Cable length: 145 ft.
Speed: 0 to 300 fpm.
Weight: 600 lbs. max.

Max. hook load: 8,000 lbs.
Max. sling speed: varies with load
600 lbs. max. with 10 duty
cycle limitation

Extraction Equipment

None

None

Thrust tool
Metal spreaders
Hydraulic metal cutters
Crowbar
Porta-power

TRANSPORTATION - APPENDIX 11-C

103 Rescue Unit
Canadian Armed Forces

Universal Helicopters
Newfoundland Limited

Sealand Helicopters Limited

Electrical
compatibility

2x28 VDC outlets and adaptors
*for equipment such as
incubators, etc.
4x115 VAC 400 cycle single phase
outlets and adaptors*.
*Adaptors may not be compatible with all makes and models of hospital
investigation is required to assure compatibility.

28 volts D.C.
115 volts A.C. 400 cycles, or
26 volts A.C. 400 cycles

115 volt/400 cycle outlets
suitable for emergency
electric blanket (205A1 and
AS332 models)

Further
equipment.

Litter capacity

Normal configuration 4
Maximum 12

2 206 series
10 205

Total number of passengers
(excluding flight crew)

18

2 AS350/355
14 AS332
4 206B
6 206L
14 205A1
5 AS350D
5 AS355F
19 AS332CK

TRANSPORTATION - APPENDIX 11-C

103 Rescue Unit
Canadian Armed Forces

Universal Helicopters
Newfoundland Limited

Sealand Helicopters Limited

Medical equipment
carried

- oxygen - 2000 ml.
- bandages - all types
- slings - 12
- splints - 12
 - wire ladder - 6
 - traction - 1
 - hare - 1
- blankets - electric - 1
 - casualty bag - 1
 - wool - 4
- sheets - 2
- spine board (lito spling) - 2
- cervical collar - 1
- IV solutions - dextrose 1000 ml x 1
- ringers lactate 1000 ml x 1
- airways - 2 adult
- 2 children
- drugs - sulface tamicle sodium ophthalmic - ointment
- calamine lotion
- tetracycline hydrochloride capsules - tablets
- nitro-glycerin tablets
- acetaminophen tablets
- diazepam tablets
- dimenhydrinate injection
- H₂O for injection sterile
- ringers injection lactated
- dextrose injection
- morphine surrette*
- *operational missions only

AS332 equipped with oxygen,
bandages, slings and splints,
traction splints, blankets,
clean sheets, spine boards/
cervical collars, intravenous
solutions, airway equipment.
All other models carry
standard first aid kits.

2 first aid kits as per
M.O.T. air regulations

Source: Information supplied by the helicopter services companies upon request by the Occupational Health and Safety ar
Related Matters Study Team.

APPENDIX 11-D

Air Ambulance
Guidelines

U.S. Dept. of Transportation
National Highway Traffic Safety
Administration

and the
American Medical Association
Commission on Emergency Medical
Services
1981

Part I

1. Risk Associated with Transporting Patients in Aircraft - General Principles

Most patients who can be transported in a ground ambulance can also be transported in an air ambulance. A partial list of medical conditions which require special knowledge or consultation are cited in the following paragraphs.

1.1 Some Medical Conditions Which Require Special Considerations (This list is given by way of example and is by no means complete.)

- 1.1.1 Heart conditions:
 - Arteriosclerotic cardiovascular disease
 - Rheumatic heart disease
 - Congenital heart disease
 - Pericarditis
- 1.1.2 Respiratory conditions:
 - Chronic obstructive pulmonary disease
 - Asthma
 - Pneumothorax
 - Pneumonia
- 1.1.3 Gastrointestinal conditions:
 - Bowel obstruction
 - GI bleeding
- 1.1.4 Neurologic conditions:
 - Epilepsy
 - Cerebral spinal fluid shunts
 - Internal hydrocephalus
- 1.1.5 EENT conditions:
 - Eye injury or surgery
 - Upper respiratory infection
 - Epistaxis
 - Motion sickness
 - Meniere's disease
- 1.1.6 Hematologic conditions:
 - Sickle cell disease
 - Anemia
- 1.1.7 Psychologic conditions:
 - Anxiety
 - Psychosis
 - Depression

- 1.1.8 Some Other Patients and Conditions:
Neonatal patients
High risk QB patients
Burn victims
Victims of spinal cord injuries
Victims of multiple systems trauma

1.2 Prearranged Transfers to and From Medical Facilities

All requests for air ambulances should be initiated by a physician. Arrangements for ground transportation at the beginning and at the termination of the flight should be prearranged in order not to delay patient transfer to and from medical facilities. If the attending physician is not knowledgeable in benefits and hazards of transporting the patient, he/she should obtain consultation from an expert in aerospace medicine prior to the flight.

1.3 Protection Against Inflight Turbulence

Inflight turbulence must be anticipated and provisions made to protect patients and transport team members. Proper restraining devices must be provided for patients, litters, and equipment. Glass containers for IV fluids and weighted traction devices must be avoided. Because of the potential for motion sickness, a patient with a restrained mandible must have a rapid release mechanism on the restraint.

1.4 Oxygen Requirements

Decreased oxygen tension at altitude (Tables 1 and 2) may be a problem even in pressurized aircraft. (Note pressure changes even in pressurized - Table 3.) Patients with cardiac or pulmonary disease, or who may be suffering from impending shock, require oxygenation during transport - even at low altitudes.

1.5 Problems With Changes in Atmospheric Pressure

The problems listed in the following subsection can be encountered at very low altitudes. Significant problems are not normally encountered by air ambulance operators who fly in areas which have elevations close to sea level, and who maintain altitudes around 1,000 feet above ground level (AGL). Helicopter air ambulance operations in some parts of the country may be in this category. Nevertheless, physicians and operators must recognize that some patients can be affected even at altitudes below 1,000 feet MSL (mean sea level).

Table 1

Altitude and Blood Gas

Altitude (feet)	Atmospheric PO ₂ (mm of Hg)	Alveolar PO ₂ (mm of Hg)	Central PO ₂ (mm of Hg)
Sea Level	159	107	98
2,000	148	96	86
4,000	137	84	80
6,000	125	71	64
8,000	116	59	55

Table 2

Altitudes at Which the Alveolar PO₂ are Equivalent -
Breathing Air vs. 100% O₂
(Unpressurized Aircraft)

Altitude (feet) (Breathing Air)	Altitude (feet) (Breathing 100% O ₂)
Sea Level	34,000
5,000	37,000
10,000	40,000

(Note: Pressure breathing and/or a pressurized cabin are required at about 39,000 feet for people who are healthy. Therefore, flying at the higher altitudes in an unpressurized aircraft will create problems for many patients - even when they are breathing 100% O₂.)

1.5.2 Medical Procedures, Injuries, and Illnesses May Induce Problems

As the altitude is increased, atmospheric pressure decreases and gases expand in closed body cavities and tissue spaces. Any medical procedure, injury, or illness in which air has been introduced into a space where it is not normally found may cause serious problems as the air expands. Examples are: pneumoencephalogram, pneumothorax, intestinal obstruction, decompression sickness, gastric distention, tracheostomy, endotracheal intubation, and esophageal airways.

Table 3
Comparative Values Due to Pressure Changes
(Typical Pressurized Aircraft)

Altitude of Aircraft (feet)	Atmospheric Pressure		Cabin Pressure (Maximum 8.6 psi differential)
	PSI	mmHg	
Sea Level	14.70	760	14.70
5,000	12.20	630	--
10,000	10.11	523	--
15,000	8.30	429	--
22,500	6.10	315	14.70
25,000	5.46	282	14.06
35,000	3.40	176	12.00
40,000	2.72	140	11.32

Ref: Cardiovascular Committee of the Cystic Fibrosis Foundation;
J. Liebman, Chairman. "Airline Travel for Children with
Chronic Pulmonary Disease." Pediatrics, 57:3(March 1976),
408-410. (Copyright American Academy of Pediatrics 1976)

1.5.3 Effects on the Eyes, Ears, and Sinuses

A decrease in atmospheric pressure as the aircraft ascends may affect an injured part not involving air, e.g., a penetrating eye injury in which decreased pressure causes the vitreous to extrude. A decrease in atmospheric pressure during ascent causes gas expansion in the middle ear cavity. Air is evacuated from the middle ear through the eustachian tube so that the pressure within the middle ear cavity matches the atmospheric pressure in the canal. As the aircraft descends and external atmospheric pressure again increases, air returns to the middle ear cavity via the eustachian tube to equalize the pressure. Because of the anatomical nature of the "flap" in the opening of the eustachian tube, it is not normal for the tube to open as pressure changes. Most individuals must force the "flap" to open by swallowing, moving their jaw, or performing the valsalva maneuver. If the eustachian tube does not function to inflate the cavity, e.g., as in an upper respiratory tract infection or in comatose patients, the difference in external and internal pressures during descent will cause the tympanic membrane to retract,

resulting in barotitis. Similar problems involving the ostia of the paranasal sinuses result in barosinusitis. Either condition may cause severe pain.

1.5.4 Equipment Affected by Pressure Changes

1.5.4.1 I. V. Containers

Plastic bags which can expand and contract with pressure changes must be used instead of rigid glass I. V. bottles. The flow rate of intravenous fluids must be continuously monitored. In this regard, an infusion pump is helpful. However, such a device should have an air bubble detector with capabilities of shutting off the pump at the first indication of air bubbles in the tubing. (Infusion pumps must not cause excessive electromagnetic interference on aircraft equipment.)

1.5.4.2 Pneumatic Medical Equipment

Air splints and pneumatic antishock trousers may expand and impair circulation or collapse and function poorly. Medical attendants must monitor these devices very closely.

No indwelling, air filled, balloon device should be used. Sterile water or a comparable medium must be used.

A Heimlich valve and an underwater, sealed chest drainage unit (e.g. Pleurevac) must be used for tube thoracotomy to accommodate pressure changes.

1.5.4.3. Cardiac Monitors*

Some cardiac monitors are sensitive to altitude changes and require proper RFI shielding. However, equipment built to the "state-of-the-art" usually functions well in the aeronautical environment.

Part II

2. Recommendations for Medical Equipment and Personnel to Support Air Ambulance Operations - Fixed or Rotary Wing

2.3 Recommendations for Additional Training in Aspects of Aeromedical Transportation

To qualify as a medical flight attendant an individual should receive training in the following areas with emphasis placed on the airborne environment:

- . For those medical personnel who have not received training in emergency medical care -- complete an EMT-A, EMT-1, or EMT-P course in accordance with the Department of Transportation curriculum or an equivalent program of instruction approved by the Department.
- . Responsibilities during the preflight, inflight, and postflight phases of an air ambulance mission.
- . Legal considerations of air ambulance service.
- . Recordkeeping for air ambulance service.
- . Lifting and moving patients.
- . General patient care inflight.
- . Medications, including the times that medications are administered and the adjustments that are required when changes are made in time zones.
- . Medical equipment used aboard aircraft.
- . Changes in barometric pressure, decompression sickness; and air embolism.
- . Changes in partial pressure of oxygen.
- . Other environmental factors affecting patient care such as humidity, temperature, ventilation, noise, etc.
- . Aircraft systems: electrical, pressurization, lighting, ventilation, etc.
- . Aircraft emergencies such as electrical failure, rapid decompression, and emergency landings.

- . Principles of survival.
- . Care of patients who require special consideration in the airborne environment. (Note: Attendants must be capable of carrying out standing orders given by the aeromedical consultant and/or the patient's attending physician in case inflight communications are disrupted.)

2.4 Recommended Recurrent Training for Medical Flight Attendants

Medical flight attendants should receive at least 8 hours of recurrent training annually in the areas cited in section 2.3. (This is in addition to training required to maintain an EMT certification.)

2.5.1 Basic Medical Equipment Recommended for Each Flight

- 1/patient - Litter or stretcher w/approved restraints
- 2/patient - Sheets
- 2/patient - Blankets
- 1/patient - Pillow w/cover impervious to moisture
- 1/patient - Pillowcase
- 1 set - Spare sheets and pillowcase (if wt. and space allow)
- 1 unit - Medical oxygen w/manual control; adjustable flowmeter w/guage (0 to 15 LPM); attachment for humidification

(Note: See 4.10.2 - Recommendations for compressed air)

(Note: The oxygen unit must be attached to the aircraft in an approved manner.)

(Note: The amount of oxygen to be carried is determined by multiplying the prescribed flow rate times the length of time the patient must be on oxygen and adding a 45-minute reserve. The minimum amount of oxygen carried should be enough to supply one patient for one hour at 10 LPM. It may be necessary to carry a portable oxygen unit if oxygen is not available for patient transfer at some point in the flight.)

- 2 each - Oxygen masks in adult, child, and infant sizes
- 6 - Connecting tubes
- 1 - O₂ key
- 1 unit - Portable suction w/connecting tubes
- 2 each - Suction catheters (various sizes)
- 2 - ??????????????????
- 1 unit - Squeeze bag-valve-mask unit capable of receiving oxygen through an inlet, and delivering 80-100%

- oxygen through the mask; w/masks in adult, child, and infant sizes. (Bags in adult and small child/infant sizes)
- 1 unit - Oxygen-powered, manually triggered breathing device (100 LPM flow rate)
- 1 - BP cuff, sphygmomanometer
- 1 - Stethoscope

(Note: In order to record BP readings, a doppler or electronic stethoscope may be required if noise and/or vibration levels are high. An electronic unit must not cause electromagnetic interference on aircraft equipment.)

- 2 each - Oropharyngeal airways in adult, child, and infant sizes
- 1 - Emesis basin
- 1 - Urinal and/or bedpan
- 1/patient - Sound suppressors
- 1 - Pneumatic antishock trousers w/pressure relief valve
- 2 - Cervical collars
- 2 - 20-gallon trash bags
- 1 box - Ziplock plastic bags or similar product
- 1 - Flashlight, 2 D batteries or equivalent w/spare batteries and bulb
- 1 - Penlight flashlight w/spare batteries and bulb
- 2 - Locking hooks (or other positive locking device for I.V. fluid containers)
- 1 qt. - Drinking water
- 12 - Paper cups

2.5.2 Dressings and Supplies Kit - Designed to be Carried on Each Flight

- 4 - Cardboard or air splints or equivalent in arm and leg sizes
- 12 - Tongue depressors
- 2 - Mouth gags or padded tongue depressors
- 1 - Bandage scissors
- 4 - Tourniquets
- 1 each - Rolls of adhesive tape, 1/2", 1", 2", 3"
- 1 each - Rolls of paper tape, various sizes
- 2 each - Syringes, 3 cc, 5 cc, and 10 cc, (TB and insulin)
- 3 each - Needles 18, 20, and 22 gauge
- 3 each - Needles, 19, 21, scalp/vein
- 2 - Surgical dressings
- 24 - Sterile gauze pads
- 6 - Nonsterile gauze pads
- 2 - Triangle bandages
- 4 - Kling bandages or equivalent
- 1 - 3" elastic bandage

- 1 - 4" elastic bandage
- 4 - Kerlix rolls or equivalent
- 2 pairs - Sterile gloves
- 3 - Petrolatum gauze
- 1 box - Adhesive bandages
- 6 - Disposable surgical face masks
- 2 - Wrist restraints
- 2 - Eye covers
- 1 roll - Aluminum foil, sterilized and wrapped
- 1 - Large safety pin
- 2 - Clinical thermometers
- 4 - Airsick bags
- 12 - Waterless towelettes
- 1 box - Tissues

2.5.3 Medication/I.V. Kit - Designed to be Carried on Each Flight

- 2 - Epinephrine HCl, 1:1,000, 1ml, prefilled syringe
- 2 - Epinephrine HCl, 1:10,000, 10ml, prefilled syringe w/intracardiac needle
- 2 - Aminophylline Inj., 1M, 500mg/2ml ampules
- 4 - Atropine Sulfate, 0.5mg in 5ml, prefilled syringe
- 2 - Diphenhydramine HCl, 50mg/ml, 1ml prefilled syringe
- 2 - Calcium Chloride Inj., 1gm/10ml, prefilled syringe
- 2 - Dextrose, 25gm/50ml, prefilled syringe
- 2 - Isoproterenol HCl, 1:5,000, 1ml ampules
- 2 - Lidocaine HCl, 2gm/10ml, prefilled syringe
- 3 - Lidocaine HCl, 20mg/ml, 5ml prefilled syringe
- 6 - Naloxone HCl, 0.4mg/ml, 1ml ampules
- 1 - Nitroglycerin, 0.4mg, Sublingual tablets, 100's
- 2 - Digoxin Inj., 0.5mg/2ml ampules
- 4 - Furosemide, 10mg/ml, 2ml ampules
- 2 - Chlorpromazine HCl, 25mg/ml, 1ml ampules
- 6 - Sodium Bicarbonate Inj., 3.75gm/50ml, prefilled syringe
- 2 - Morphine Sulfate, 15mg/ml, 1ml prefilled syringe
- 1 - Hydrocortisone Sodium Succinate, 1,000mg/vial
- 1 - Methylprednisolone Sodium Succinate, 1,000mg/vial
- 2 - Sterile Normal Saline for Inj., 20ml
- 2 - Sterile Water for Inj., 20ml
- 3 - Diazepam, 5mg/ml, 2ml, prefilled syringe
- 6 - Alcohol swabs
- 1 - Phenylephrine HCl, 1/4%, Nasal Spray
- 2 - Ammonia Inhalant Solution, 0.5ml ampule
- 3 - Needles, 15 gauge, 1 1/2"
- 1 - Tourniquet
- 1 - 0.9% Sodium Chloride Inj., 500ml bag
- 1 - 0.9% Sodium Chloride Inj., 250ml bag
- 1 - Lactated Ringer's Inj., 250ml bag
- 1 - Lactated Ringer's Inj., 500ml bag
- 2 - Lactated Ringer's Inj., 1,000ml bag

- 2 - Intravenous Injection Sets w/micro dripper
- 1 - Dextrose, 5% in water, 250ml
- 1 - Dextrose, 5% in water, 500ml
- 1 - Dextrose, 5% in normal saline, 250ml
- 1 - Dextrose, 5% in normal saline, 500ml
- 1 - Pressure pack or infusion pump
- 1 each - Drip tubing, reg. and ped.
- 2 - Arm boards
- 6 - Alcohol wipes
- 1 - Clean hemostat
- 1 each - Sterile hemostat, curved and straight
- 1 - Nasogastric tube, 14 gauge
- 1 - Plasma Protein Fraction, 250ml w/infusion set
- 2 pair - Sterile gloves
- 1 - Knife handle
- 1 - Subclavian set
- 1 - No. 15 blade
- 1 - I.V. infusion cuff
- 1 each - Tape, 1" and 2"

2.5.4 Airway Management Kit - Designed to be Carried on Each Flight

- 1 - Laryngoscope, w/curved and straight blades in various sizes; spare batteries and bulb
- (As required) - Adapters for attaching endotracheal tubes to O₂, etc.
- 1 - Rubber shod forceps
- 1 - Magill forceps
- 1 - Esophageal Obturator airway /gastric suction capability
- 1 - McSwain dart or Heimlich valve
- 1 - Syringe, 60 cc
- 1 - Needle, 14 gauge
- 1 - Syringe, 10 cc
- 1 each - Adhesive tape, 1" and 2"
- 1 - Viscous Lidocaine HCl, 2% 100ml
- 1 tube - Surgical lubricant

2.5.5 Burn Kit - To be Carried When Required

- 3 - Normal Saline, 1,000 cc in plastic container
- 1 - 57" x 80" sterile burn sheet
- 5 packs - Xeroform gauze, 5" x 9"
- 1 - Irrigating syringe, 50 cc
- 2 pairs - Sterile gloves
- 4 - Kerlix rolls
- 2 packs - Fluffy gauze

2.5.6 Poison Drug Overdose Kit - To be Carried When Required

- 1 - Irrigation Tray

- 1 the patient from the aircraft
- Cardiac board

2.5.11 Additional Equipment for Specific Patients - To be Carried When Required

- 1 unit - Respirator capable of continuous ventilation, w/ventilator, tubing, exhaled volume measuring device, set of tracheostomy and endotracheal adaptors
- 1 unit - Incubator, w/all equipment suitable for neonatal care

2.5.12 Electromagnetic Interference from Medical Equipment

No medical device should be used which produces electromagnetic interference on aircraft navigation or communications equipment. Medical equipment should be tested prior to flight to insure that it does not interfere with aircraft systems.

2.5.13 Precautions for Specific Equipment and Supplies

- . Facial or jaw retention devices (jaws wired shut) are contraindicated unless a method is prescribed to permit expectoration and removal of vomitus.
- . All medical equipment in the aircraft must be secured in approved racks, bins, or compartments during flight. It is critical that oxygen bottles be properly restrained.
- . Saline tends to crystallize, obstructing the outflow tract and preventing decompression of balloons in Foley catheters, endotracheal tubes, etc. Sterile water should be used for inflation.
- . Some medications have a short shelf-life and/or may be affected by temperature.

2.5.14 Litter Attachment Rules

Litter attachments, if installed under a Supplemental Type Certificate (STC), must meet the same "g" requirements as those contained in FAR Part 23.561 or FAR Part 25.561 for seats. These requirements are:

- Upward (Part 23) - 3.0 g's
 - Upward (Part 25) - 2.0 g's
 - Forward (both parts) - 9.0 g's
 - Sideward (both parts) - 1.5 g's
- Part 27.561 and Part 29.561 contain "g" requirements for rotor craft as follows:

- Upward - 1.5 g's

Forward - 4.0 g's

Sideward - 2.0 g's

Gust load requirements in these rules must also be considered if applicable. The local FAA Flight Standards District Office should be contacted for STC or other approvals.

2.6 Recommendations for Aircraft Equipment and Design

2.6.1 Heating System

The heating system should have the capability of maintaining the cabin temperature at about 75°F during all phases of operation.

2.6.2 Communications systems

The aircraft must have a radio capability to communicate air-to-ground and air-to-air.

This system should include two-way communications with physicians who are responsible for directing patient care in transit, and with ground personnel who coordinate the transfer of the patient to surface transportation.

2.6.3 Lighting System

Interior lighting should be adequate for patient observation and care under all circumstances. During night operations a curtain should be used if necessary, to protect the cockpit from lights in the patient section.

2.6.4 Pressurization

Normally, fixed wing air ambulances should be pressurized. In an emergency, it may be necessary to use an unpressurized aircraft. However, in the interests of proper patient care, pressurized fixed wing air ambulances should be used on flights that can be planned or scheduled.

2.6.5 Ideal Aircraft Configuration

Very few, if any, of the small fixed and rotary wing aircraft built today have adequate space in the passenger section to accommodate the functions associated with good emergency medical care. Therefore, the following sections simply describe desired conditions with expectations for the future.

2.6.5.1 Loading Stretchers and Litters

Aircraft doors should be large enough to allow a stretcher or litter to be loaded without rotating it more than 30 degrees about the longitudinal (roll) axis or 45 degrees about the lateral (pitch) axis. Some patients cannot even tolerate these movements and professional medical judgment must be used to decide whether an air ambulance should be used at all if loading is a problem.

2.6.5.2 Positioning the Stretcher and Litter

The stretcher or litter should be positioned so as to allow the medical attendant a clear view of and access to any part of the patient's body that may require attention. The attendant should always have access to the patient's head and upper body.

The upper surface of the litter should not be less than 30 inches from the ceiling of the aircraft or the under surface of another litter. To conduct CPR, as much as 40 inches may be desired. A conventional stretcher or litter will be at least 19 inches wide and 73 inches long. Between 12 and 18 inches of clear aisle at the head and on one side of the litter is desirable.

When possible, litters should be installed laterally in the aircraft to provide better restraint against forces which may be encountered in a crash.

2.6.5.3 ???

The patient should be sufficiently isolated from the cockpit to minimize inflight distractions and interference which would affect flight safety.

2.7 Maintenance of Medical Equipment and Supplies

- . Each piece of linen and each blanket used for a patient should be cleaned after each use and disinfected as necessary.
- . Each piece of equipment coming in contact with a patient should be properly washed and disinfected after use.
- . Each stretcher pad, mattress, or pillow should be impervious to moisture.
- . Each cover for any pad, mattress, or pillow, and each pad, mattress, and pillow, if used without a cover, should be cleaned and disinfected after each use.
- . All medical equipment used in air ambulance operations must be maintained according to the manufacturer's recommendations, and adequate records should be available to indicate that required maintenance has been performed.

Part IV

4. Transportation of Patients with Specific Medical Problems

4.2 Pressure Factors

4.2.1 Boyle's Law Applied to Body Gases

Assuming that a given temperature remains constant, which is certainly true inside the human body and relatively true inside the modern aircraft, Boyle's Law states that the volume of a dry gas is inversely proportional to the pressure to which it is subjected: the lower the pressure, the greater the volume, and vice versa. Expansion of gases inside the human body will be slightly greater than dry gases because of the moisture content of body gases, but this difference usually is not significant. At sea level, on a standard day, the cabin pressure of an aircraft will be 760 millimeters, or 29.92 inches of mercury (14.7 psi). At 8,000 feet the barometric pressure will decrease approximately 26% to 564.6 mm Hg(11.9 psi). Air inside the body will expand by more than a fourth if it isn't constrained.

At altitude, when trapped air is constrained and allowed to expand only slightly, it remains at a somewhat higher pressure than the surrounding tissues. If the air is in a fixed space such as the bony sinus, it will not expand at all and will remain at its original pressure, ?????? higher than the pressure of the surrounding tissues. As Boyle's Law predicts, at 18,000 feet the atmospheric pressure decreases to approximately half of the sea level pressure (7.3 psi), and the volume of a given amount of air doubles. However, because the human body is a wet system and the partial pressure of water vapor must be considered, a given quantity of air in the body would normally double in volume at about 16,000 feet. But as a practical matter, gas expansion is resisted by body tissues as they stretch and local pressures increase in the affected areas.

4.2.2 Dangers Associated with Hyperbaric Exposure

If a patient has experienced recent hyperbaric exposure (e.g scuba or deep sea diving), particularly if that exposure has already caused complications such as bends or air embolism, it is mandatory that he or she be maintained at maximum pressure during transport. If available, a small one-person hyperbaric chamber can be carried in a larger aircraft to provide optimum oxygenation and pressurization. Arrangements to obtain

such a chamber are time-consuming and complicated, and should be anticipated and worked out in advance whenever possible. Some pressurized aircraft can maintain sea level pressure to moderate altitudes, and can be used in an emergency situation when the patient must be transported immediately. Patients who may suffer from nitrogen bubbles in their blood and tissues after a caisson accident should also be transported in a pressure chamber.

4.2.3 Precautions in Using Medical Equipment

An increase in altitude increases either the relative pressure or the volume of air in body spaces and all enclosed spaces such as, I.V. bottles, tubing, drainage bottles, and cuffed or balloon-tipped devices such as endotracheal tubes or Foley catheters. Since liquids do not significantly change volume with pressure, problems can be prevented by eliminating air spaces in I.V. sets, using collapsible plastic bags, and filling cuffs or balloon tips with sterile water or saline. A one-way, flutter valve (e.g., Heimlich valve) and an underwater, seated chest drainage unit (e.g., Pleurevac), rather than a simple drainage bottle, should be attached to chest tubes during air transport.

If trapped air is a real or potential problem for a patient, a pressurized aircraft and/or a low altitude flight should be arranged whenever feasible.

4.2.4 Special Care Required for Certain Medical and Surgical Conditions

Several medical and surgical conditions are affected by increasing altitude and thereby decreasing barometric pressure. Expansion of gases in the normal intestinal tract can be expelled as flatus, but a patient with a colostomy should consume a low residue diet and wear a larger bag to accommodate for gas expansion. Patients with an intestinal malfunction (e.g., obstruction, ileus, diverticulitis, perforation, fresh surgery, etc.), should be transported by air only when it is urgently necessary and then a pressurized aircraft may be required. Intestinal air trapped in a hernia or volvulus may expand and further decrease an already compromised bowel circulation. Extraluminal and intraluminal air may expand and compromise a tight incision repair or produce a leak in bowel anastomoses. Patients with emphysematous blebs or bullae in the lungs, or with nonpulmonary air in the thorax, such as in a pneumothorax, pneumomediastinum, pneumopericardium (often associated with chest injuries such as rib fractures and flail chest), or with recent

thoracostomy or tracheostomy with subcutaneous emphysema, should delay air transport as long as possible or until they are stabilized. Then only pressurized aircraft should be used. Patients with intraocular or intracranial air from surgery, scuba diving, penetrating injuries and fractures, or diagnostic procedures such as pneumoencephalography require these same precautions.

Barosinusitis and aerotitis may occur in any person and usually is secondary to edema of the nasopharynx from upper respiratory infection, allergy, or irritation from smoke, smog, chlorinated pools, etc. Expanding air during ascent is expelled through narrowed, boggy eustachian tubes or from nasal sinus ostia. But air cannot be drawn back through the openings during descent. Such ear or sinus problems in persons with nasal congestion and irritation, and/or a history of prior problems, can be anticipated and possibly prevented by having the patient yawn and swallow frequently. Using oral and antihistamines and decongestant medications, and administering nasal drops or sprays before and during flights can also be effective. A sleeping or unconscious adult may develop aerotitis during rapid descent in an aircraft, and infants are particularly susceptible because of the underdeveloped mandible which produces flattening and lateral direction of the eustachian tube.

Once symptoms have developed, relief may be provided through liberal use of nasal sprays, inhalation through a warm, moist towel, and aggressive yawning and swallowing. If swallowing with the nostrils pinched shut fails, a modification of the Politzer maneuver may be attempted by pinching the nose, and with a good breath use the cheek, throat, and chest muscles to try to blow the fingers off the nose. If no success, the patient should try to hold pressure in the back of the nose and swallow at the same time. An infant who suddenly begins to cry during descent may be distended and may be relieved by promoting swallowing from a feeding bottle, a pacifier, or a clean finger tip. Patients who have oxygen administered during flight are especially susceptible to aerotitis media due to the high concentration of oxygen middle ear. These patients should perform Valsalva's maneuver many times after the oxygen is removed at ground level.

Aerodontalgia, tooth pain from barometric changes, usually due to air in dental caries under a filling (e.g., a dental abscess with gas-forming organisms), may cause severe toothache during flight. This can be relieved somewhat by holding ice inside the mouth or over the cheek at the painful area to cool the trapped air and decrease the pressure. It will also be relieved as the

plane descends and the surrounding barometric pressure increases. Patients with facial or mandibular fractures which have retention wires in place should not fly unless the wires can be quickly released in case of vomiting, nosebleed, or the need for oropharyngeal suctioning.

4.2.5 Altitude/Cabin Pressure Limitations May be Indicated Even When Oxygen is Available

Even when supplemental oxygen is available, caution dictates that the following altitude/cabin pressures should be adhered to and not exceeded when patients with specific medical problems are aboard:

8,000 feet (2400m)

- . Respiratory disease with a vital capacity of less than 900 ml (adult).
- . Recent myocardial infarction.
- . Cardiac valve defects.
- . Space occupying lung lesions (abscess, cyst, tumor)
- . Anemia: 1) less than 3,000,000 rbc per mm; 2) less than 8.5 gm% hemoglobin; or 3) hematocrit less than 25%.
- . Recent thoracic or abdominal surgery (within 10 days).
- . Diving activity within 24 hours at depths less than 13m (42 feet), and of for not more than 13 hours' duration.

5,000 feet (1500m)

- . Gas inclusions in a body cavity (e.g., pneumothorax, pneumoperitoneum).
 - . Untreated, perforating eye lesions.
- (Note: To reduce crew/patient discomfort, the pilot of a pressurized aircraft must land with as little differential in pressure as possible between the aircraft and the atmosphere.)

4.3 Oxygen Factors

4.3.1 Physiological Effects of Partial Pressure

Although the proportion of oxygen in the air remains the same (21%) at all altitudes, it is obvious that when there is less air there is also less oxygen and less pressure to drive alveolar oxygen into lung capillaries. The amount (partial pressure) of oxygen in the air at any altitude is calculated by multiplying the barometric pressure at that altitude by the constant volume

percentage of oxygen. At sea level, on a standard day, the partial pressure of oxygen is $760 \text{ mm Hg} \times 21\% = 160 \text{ mm Hg}$ at ambient or atmospheric PO_2 , while the alveolar PO_2 is 107 mm Hg and the average arterial blood PO_2 of normal patients is 98 mm Hg . At $8,000$ feet, the ambient PO_2 is 116 mm Hg , alveolar PO_2 is 70 mm Hg , and arterial PO_2 is 60 mm Hg in a healthy person with normal cardiac and pulmonary functions.

Figure 1 is a nomogram which can be used to predict inflight arterial oxygen tension at various altitudes if the preflight PO_2 is known.

A drop in arterial PO_2 , such as the one described above, would cause understandable concern in a hospitalized patient, but it can be improved rapidly by having the patient breathe a higher concentration of oxygen. By doubling the volume percentage of oxygen from 21% to about $40\text{--}45\%$, the alveolar PO_2 is nearly doubled, and the arterial PO_2 is returned very nearly to the sea level partial pressure of 98 mm Hg . Because the air at altitude is thinner, with less partial pressure of all gases, a given flow rate of supplemental oxygen will produce a somewhat higher mask oxygen concentration at altitude than would be expected on the ground.

If a patient already has impaired oxygenation, CO_2 retention, or an alveolar-capillary block before flight, a drop in arterial PO_2 due to altitude alone may cause rapid and potentially fatal problems. As a rough rule of thumb, altitude is poorly tolerated (without extra oxygen and pressure) by patients on room air with arterial) saturation below 90% , arterial PO_2 below 80 mm Hg , and a maximum voluntary ventilation of 40 liter/min or less.

4.3.2 Recommended Altitudes When Oxygen is Not Available

If supplemental oxygen cannot be supplied the American College of Chest Physicians has recommended very low altitude limits for cardiorespiratory patients (Figure 2). These ceilings do not take into account the altitude of the sending or receiving hospitals. A patient in Denver is already a mile above sea level, and the mountain climber or skier may be on the ground at an altitude of $10,000$ feet or more. In mountainous terrain, even these altitude limits may be exceeded by ground ambulances if they ascent from a low valley through a high mountain pass on their way to a receiving hospital. Whatever the vehicle, the patient with impaired oxygenation or with increased risk from hypoxia must have enough supplemental oxygen at adequate flow rates for the

duration of any exposure above 2,000 feet (MSI).

Figure 2

Altitude limits for Patients With Cardiorespiratory
Diseases (Without Supplemental O₂)

Limit (feet)	Problem
10,000	Any suspected or symptomatic cardiorespiratory disease
8,000	More than mildly symptomatic Marked ventilatory restriction
6,000	Recent MI (8-24 weeks) Angina pectoris Sickle cell disease Alveolar block with cyanosis Clinical cyanosis or Cor pulmonale any one or Respiratory acidosis
4,000	Severe cardiac disease with cyanosis or recent decompensation Patients with any two: clinical cyanosis or cor pulmonale or respiratory acidosis
2,000	Cardiac patients in failure MI 8 weeks Patients with all three: clinical cyanosis cor pulmonale respiratory acidosis

Ref: American College of Chest Physicians, Committee on
Physiologic Therapy, Section on Aviation Medicine. "Air
Travel in Cardiorespiratory Disease," Diseases of the Chest,
37(1969), 579-588. (By permission of Chest)

4.3.3 Aviation Oxygen vs. Medical Oxygen

The type of oxygen used is important. Aviation oxygen

yellow tank) has very little moisture and is kept dry to prevent freezing at higher altitudes. If used for a patient, it should be humidified if at all possible, distal to the valve, and preferably close to the patient.

Medical oxygen (green tank) has more moisture, but may freeze at the valve and restrict or shut off the flow at higher altitudes or colder temperatures. It also requires extra humidification whenever possible. Medical oxygen meets vigorous standards for purity and is the preferred gas when transporting patients with pulmonary disease. Aviation oxygen may contain impurities or irritants and should be used only in emergencies. If the patient has difficulty in clearing pulmonary secretions or in diffusing oxygen into alveolar capillaries in the hospital, even though his PO_2 is within normal limits, it would be prudent to include Intermittent Positive Pressure Breathing (IPPB) equipment and a respiratory therapy for the flight.

4.3.4 Hypoxia in Other Than Pulmonary Patients

Some patients, other than those with pulmonary problems, have a higher than normal risk of suffering hypoxia. These patients include those with: significant anemia (either chronic or acute from blood loss); decreased tissue perfusion from shock; hemoglobinopathies (especially sickle cell disease); obstruction of coronary or cerebral arteries; peripheral vascular disease and tissue compromised by impaired circulation in diabetes, Burger's Disease, frostbite, or Raynaud's Disease; familial dysautonomia (Riley-Day syndrome); and retinal injury or disease. If a patient's hemoglobin level is below 8.5 gm %, hematocrit below 25% or red blood count below 3,000,000/mm³, supplemental oxygen should be administered during the entire flight.

4.3.5 Supplemental Oxygen for Eye Patients

The retina has the highest oxygen requirement of any tissue, and early pioneers in balloons reported visual difficulties and even blindness as some of their most dramatic encounters with high altitude hypoxia. Patients with previously stable retinopathies may tolerate low altitudes and full pressurized flights without difficulty, but an unexpected ascent or loss of pressure may produce rapid deterioration without immediate supplemental oxygen being administered. Furthermore, hypoxia occurring above an altitude of 10,000 feet produces a compensatory dilatation of retinal and choroidal vessels. A diseased or injured vessel may have a recurrence of intraocular bleeding from vasodilatation.

Supplemental oxygen must be provided any patient with eye injuries, recent eye surgery, or any recent or progressive retinal disease. It appears that the intraocular pressure of glaucoma is not significantly affected by barometric changes under 10,000 feet, but the potential for retinal hypoxia remains a risk and an obvious indication for supplemental oxygen.

4.4 Motion Factors

4.4.1 Flight-Induced Forces Must be Considered for Stretcher Patients

During takeoff and landing, aircraft are subjected to significant acceleration and deceleration forces. Further, the very nature of flight requires an aircraft to assume various altitudes which may be associated with greater than normal gravitational forces. These forces are easily tolerated by a healthy person in a sitting position. However, during takeoff, a stretcher patient in an aircraft may feel rather flushed and uncomfortable if his/her head is placed toward the tail, or rather weak ("drained") and breathless if his/her head is placed toward the nose of the aircraft. All of this is due to a rather significant redistribution of blood volume. This effect recedes several minutes after the aircraft reaches cruising altitude and levels off. It may recur slightly in the opposite direction as the aircraft is maneuvered for an approach to landing. Acceleration forces occurring during the takeoff and climb may cause significant problems in patients with pulmonary disease or cerebral edema if they are placed with their heads toward the tail. Patients in shock, or who have a deficiency in their blood volume and compromised circulation, may encounter a problem if their heads are placed toward the nose of the aircraft. These effects can be minimized by placing the stretcher laterally in the aircraft. However, this may not be possible in small aircraft. The head or foot of the stretcher can be elevated to help distribute acceleration forces in a transverse direction through the body and to counteract the angle of climb.

4.4.2 Turbulence Problems

During flight, turbulence may be encountered which bounces the aircraft severely. Unsecured supplies may be scattered and the patient may experience a wide range of gravitational forces. Most of these forces are in the vertical direction, which makes the customary skeletal traction with weights not only useless, but actually dangerous. Oxygen bottles must be restrained at all times.

4.5 Neurological/Psychological Factors

4.5.1 airsickness

Turbulence may produce significant anxiety and vestibular stimulation, often causing airsickness. Adequate suctioning and proper patient positioning to prevent aspiration of vomit are important if the patient becomes airsick. If turbulence is predicted, and especially if the patient has a prior history of motion sickness, medications may be administered before takeoff. Dimenhydrinate, meclizine hydrochloride, and similar antiemetics may help. The combination of 25mg ephedrine sulfate and 25mg promethazine, or the combination of 5mg dextroamphetamine sulfate with 0.3mg scopolamine hydrobromide, has been reported as very effective for airsickness.

4.5.2 Fear of Flying

If patients have a fear of flying, they should receive sedation when their condition allows. If they have a history of seizures, appropriate anticonvulsants should be given before the flight. Convulsions seem to be easily precipitated during air transportation, probably due to factors such as apprehension, hypoxia, hyperventilation, and flicker vertigo (disorientation caused by the strobelike effect of light passing through or being reflected off a rotating object such as a helicopter rotor system).

Disoriented or psychotic and agitated patients should be under heavy restraints and sedation during air transportation. If immobilization and control cannot be guaranteed; such patients should not be transported by air, since uncontrolled behavior presents a threat not only to the patient's life, but to the lives of the entire crew as well.

4.6 Isolation Factors

An aircraft in flight is physically isolated from all but radio assistance until the pilot can locate and land at the nearest airport/heliport which has medical facilities immediately available. Air ambulances should have contingency plans for all emergency situations which may occur while the aircraft is in flight.

4.6.1 Contingency Planning for Cardiac Patients

For every cardiac patient, contingency plans should include the equipment and personnel to provide advanced

cardiac life support. All electrical equipment should have a preflight check, including a defibrillator discharge test. Despite the desire to avoid weight and crowding, it is better to plan on too much equipment than too little.

4.7 Extrication Factors

If a patient is in a bulky or potentially restrictive cast, careful consideration should be given to bivalving the cast before flight. This provides a method for eliminating undue restrictions to excessive swelling and facilitates rapid extrication in the event of an emergency.

4.8 Limitations of the Air Ambulance

Most aircraft are streamlined with small doors, a small interior space, and limited patient access. Usually, only part of one side of the interior is open and CPR is difficult to perform on a stretcher patient. There is little overhead room to maintain a gravity-fed intravenous system. Poor lighting at night, and enough noise to mask heart sounds, breath sounds, blood pressure readings, and even ordinary conversation are frequently a problem. Therefore, digital readouts and doppler BP units may be very useful in flight. (The stethoscope may be used to communicate with a patient in a very noisy environment by placing the ear pieces in the hearer's ears and talking into the bell.)

Other limitations notwithstanding, the patient's head and thorax should be accessible to the medical attendant. If CPR is a significant consideration, a lightly padded backboard should be in place before takeoff. When the dimensions of the patient section do not allow conventional CPR, a mechanical CPR device may be required.

Intravenous fluid flow rate must be monitored constantly. The flow may need to be regulated by using a lightly inflated BP cuff around the plastic bag of fluid or an infusion pump. Suction must be adequate and appropriate.

Inverters may be needed to provide a usable energy source for medical equipment. However, modern monitors and defibrillators have excellent battery packs which will last for the duration of most flights. A spare charged battery pack, as well as spares for all other essential equipment, including all tubes and breakable equipment, should be carried.

APPENDIX 13-AMEDICAL EMERGENCY RESPONSE TEAM - EQUIPMENT/DRUGSBOX A (AIRWAY)

Laryngoscope (spare batteries and bulbs)

2 Blades (Macintosh No. 3 and No. 4)

Shiley Hi-lo pressure endotracheal tubes (Sizes 7, 8, 9)

Shiley tracheostomy tubes (Sizes 5, 5.5) for cricothyroidotomy

Disposable scalpels (2) No. 11 blade

Tracheal spreader (3 prong)

Hemostats (2)

Needle holder (1)

Scissors - 1 Metzenbaum, 1 suture scissors

Oropharyngeal airways (small, medium, large)

Nasopharyngeal airways (small, medium, large)

Adhesive tape

Tincture of benzoin

Xylocaine laryngeal spray

Oxygen face masks (2) non-rebreather bag

Laerdal resuscitation bags (2) with small, medium, large masks plus oxygen reservoir

Portable suction device (Laerdal)

Yankhaur tonsil suction (2)

Transtracheal suction catheters

Nasogastric tubes (Salem sump - size 20)

Oxygen cylinders with regulators and humidifiers

Electronic hypothermia thermometer with thermistor probe (Yellow

Spring Instruments)

Flashlight with spare batteries

Esophageal obturator airways (2)

Endotracheal stylette

Magill forceps

Recording materials (international disaster tags)

Entonox cylinders and delivery apparatus

BOX B (BLEEDING)

Vascular clamps

Tourniquet (2)

Angiocaths (No. 14, 16, 18)

Central line kit (Blit kit) (2)

CVP set (2)

N. Saline 1000cc. (4)

Blood pump set

I.V. solution sets - macro and micro drip

4"x4" sterile gauze (bulk package)

2", 3", 4", 6" elastic bandages (ACE)

Bandage scissors (Medic type)

Triangular bandages (12)

Adhesive tape 1/2", 1", 2", 3"

Betadine swabs and prep sticks

Tongue depressors

Hetastarch (plasma expander)

5% Dextrose/water 250cc (3)

BOX C (CUTTING)

Laparotomy set

Orthopaedic bone saw

Suture material (2-0, 3-0, 4-0 silk; 2-0, 3-0, 4-0 chromic gut)

Neurosurgical brace and bit

2 Chest tubes (McSwain thoracostomy set with Heimlich valve)

Pericardiocentesis needle/syringe/3 way stop cock

Alligator clips and cables

Surgical gloves (Size 7, 7.5, 8)

Face masks/gowns/caps

Betadine prep solution

BOX D (DRUGS)

Adrenalin 1mg/cc ampoules (2)

Adrenalin preloaded syringes 1mg/10cc (3)

Atropine 1mg preloaded (3)

Bretylium tosylate 500mg amp. (2)

Calcium chloride 10cc. 10% solution

Dexamethasone 10mg/cc 100mg amp. (1)

Digoxin 0.5 amp. (2)

Dopamine 200mg amp. (2)

Furosemide 40mg preloaded (3)

Isoproterenol 1mg amp. (2)

Lidocaine 100mg preloaded and 2 gm cardiac (2 each)

Morphine sulphate 10 mg (4)

Naloxone 0.4 mg amp. (12)

Nitroglycerin sublingual gr.1/150 (1 bottle)

Phenytoin 250mg amps. (4)

Procainamide 1gm. amp. (3)
 Verapamil 10mg amp. (3)
 Ketamine HCl 50mg/cc 10cc vial (4)
 Succinylcholine 400mg vial (2)
 Pancuronium 4mg vial (5)
 Sodium bicarbonate 50 meq preloaded (4)
 50% Dextrose 50cc preloaded (4)
 Mannitol 1000cc 10% soln. (2)
 Diazepam 10mg preloaded (3)
 Diphenhydramine 50mg amp. (2)
 Lidocaine 1% with and without epinephrine 20cc vial (2)
 Neostigmine 0.5mg/cc 10cc (1)
 Clindamycin parenteral
 Cefamandole parenteral
 Pentothal sodium 250mg (2)
 Aminophylline 500mg (2)
 Syringes 1cc, 3cc, 10cc, 20cc, 50cc
 Needles 19 gauge, 21 gauge (12)
 Betadine swabs

BOX E (EQUIPMENT)

Monitor-defibrillator (Life Pak 5)
 Cervical collars (Plastizote) small, medium, large
 MAST trousers (adult and paediatric)
 Tare traction splint
 Spine board/straps
 Air splints (long and short arm/leg)

Board splints

Ring cutter

I.V. poles/stretchers

Sphygmomanometer (aneroid)

Stethoscopes (2)

Pressurevail aneroid arterial monitor (attaches to arterial or central venous line)

Ventillator (gas-powered)

EENT (diagnostic) set

Reflex hammer

Safety pins

Q tip cotton swabs

Tuning fork

Lab stix/Dextrostix

Foley catheters No. 12, 16 30cc baloon

	Health Sciences Centre	St. Clare's	Grace Hospital
A. Number of Beds:			
Medical:	112	321	310
Surgical:	148	113	82
Critical Care:	140	171	165
Neurosurgery:	16	12	12
Burn Unit:	2	-	-
B. Operating Room:			
Number of Rooms:	9	6	5
Limitations:	Nil	Neurosurgery Open Heart	Neurosurgery Open Heart
Staffing:	On call after 2400 hrs.	On call after 1900 M-F, and after 1600 W/E	On call after 1600 M-F, and all W/E
C. Radiology:			
Number of Rooms:	14	6	7
Limitations:	Nil	No angiography Limited Neurorad.	No C-T Scanning
Staffing:	In-house 24 hrs/day	On call after 2300 hrs	On call after 2300 M-F and after 1500 on W/E
D. Laboratory:			
Capabilities:	Comprehensive	Comprehensive	Comprehensive
Blood Bank:	Yes	Yes	Yes
Staffing: (Laboratory)	In-house 24 hrs/day	In-house 24 hrs/day	In-house 24 hrs/day
E. Emergency Department:			
Bed Spaces:	14	8	8
Staffing:	RNs/MDs in Dept. 24 hrs/day Fulltime Emerg. Phys.	RNs/MDs in Dept. 24 hrs/day Emerg. Phys. at nite	RNs/MDs in Dept. 24 hrs/day Fulltime Emerg. Phy.
F. Medical Staff:			
Emergency Med:	6	1	4
General Surgeons:	8	4	5
Internists:	34	13	11
Anesthetists:	8	4	4
General Prac.:	12	45	22
F.N.T.:	-	-	4
Ophthalmologists:	4	1	1
Orthopaedists:	6	2	-
Gynaecology:	5	5	3
Urology:	3	-	2
C-V Surgeons:	3	-	-
Neurosurgeons:	2	-	-
Radiologists:	9	4	4
Psychiatrists:	4	4	5
G. Communications:			
Pre-hospital:	VHF radio	VHF radio	VHF radio
In-house:	Telephone, Beeper, P.A., Intercom.	Telephone, Beeper Intercom, P.A.	Telephone, Beeper Intercom, P.A.
H. Transportation:			
Ambulances:	6 (shared)	6 (shared)	6 (shared)
Helipad:	Yes. Lighted	No	Desig. area. Lighted.
Nearest Airports:	Torbay	Torbay	Torbay
I. Emergency Response Kit:			
Kept where?	Emergency Department	Emergency Department	Emergency Department
Monitor/defib.:	Yes - in kit	Avail in-house	Avail in-house
MAST Trousers:	Yes	No	No
I.V. Fluids:	Yes	Yes	Yes
Bandages:	Yes	Yes	Yes
Drugs:	Yes	Yes	Yes
Disaster:	Yes International type	International type	International type
J. Formal Disaster Plan?	Yes	Yes	Yes
K. Transfer Arrangements:			
	Yes St. Clare's, Grace, Janeway Halifax, Toronto, Montreal	Yes H.S.C., Grace, Janeway Halifax, Mtl., Toronto	Yes H.S.C., Janeway St. Clare's, Mtl.,
L. Local Resource Limits:			
Critical:	5-10	5	5
Urgent:	30	10	10
Non-urgent:	100	20-25	20-25

OFFSHORE MEDICAL EMERGENCY FLOW CHART

